The role of professional learning communities for beginning teachers' learning outcomes and intention to leave the job

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Voorwoord

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~ Opgedragen aan Lisette Cnudde ~

Contents

Chapter 1

General introduction

Abstract

This chapter serves as a general introduction to the research theme of the dissertation and delineates the context in which the subsequent chapters of this dissertation are situated. The first section of this chapter presents the general theoretical background. First, school factors, with special attention to professional learning communities, and contextual factors are presented. Second, teachers' psychological states and outcomes are discussed. Following this, the problem statement is set down and transformed into specific research objectives. Furthermore, information on the overall research design is presented. At the end of this chapter, an outline of this dissertation and an overview of the content of the different chapters is provided.

Introduction

"Teaching today is increasingly complex work, requiring the highest standards of professional practice to perform it well."
Hargreaves and Goodson (2007, p. xi)

Researchers recurrently emphasize that teaching is a very demanding profession fueled by the complexity of the changing world (Darling-Hammond, Chung Wei, Alethea, Richardson, & Orphanos, 2009). In particular, beginning teachers, who need to take full pedagogical and legal responsibility as soon as they start teaching, have a hard time to fulfill the expectations of the teaching profession (Tynjälä & Heikkinen, 2011). Two aspects that specifically challenge the educational field nowadays are (a) how to professionalize beginning teachers once they start teaching and (b) how to retain beginning teachers in the teaching profession. Over the past decades, voices have raised that in order to stimulate beginning teachers' professional learning and reduce their intention to leave the profession, beginning teachers need to work in highly collaborative ways with other members of the school team (Fantilli & McDougall, 2009; Johnson & Birkeland, 2003; McCormack, Gore, & Thomas, 2006). As such, it is important that schools become learning organisations, which offer teachers many collaborative opportunities. Although multiple school conditions are conducive to teacher learning, vigorous professional learning communities (PLCs) occupy a central role in providing those collaborative opportunities for teachers that boost their professional learning (Little, 2012; Lomos, 2012; Stoll, Bolam, McMahon, Wallace, & Thomas, 2006; Stoll & Louis, 2007a). Moreover, a PLC can act as a buffer against external conditions that cause people to leave the teaching profession (Boyd et al., 2011). A PLC can provide a climate in which beginning teachers feel supported. This does not only stimulate their professional learning. It also enhances their well-being and reduces their intention to leave the profession. However, few studies have explored in which way PLCs particularly help beginning teachers to stay

in the profession and professionalize their teaching. As the first teaching years are characterized by many new learning processes, we will concentrate on one specific learning process that is identified as very complex for beginning teachers teaching in primary schools, namely the implementation of differentiated instruction (DI) in the classroom practice (Fantilli & McDougall, 2009; Mansfield, Beltman, & Price, 2014). DI is a pedagogical approach that focuses on how teachers fit the level of task complexity, pacing, and learning activities to the needs, readiness, and interests of individual students (Tomlinson et al., 2003). Consequently, beginning teachers' professional learning in DI and their intention to leave the job will be the outcome variables of this dissertation.

In the organizational psychology literature, the Job Demands-Resources (JD-R) model has revealed that support from or collaboration with colleagues is an important job resource that does not function in isolation from other factors. Next to support from colleagues, work autonomy is identified as an important job resource that stimulates the professional development and decreases the turnover intentions of the employees (Bakker, Demerouti, & Schaufeli, 2003; Bakker, Demerouti, & Verbeke, 2004). Hence, teacher autonomy will be taken into account as a second school factor, besides PLCs in this dissertation. In addition, research has indicated that teachers' psychological states have an important role in the abovementioned teacher outcomes. More concrete, teacher self-efficacy may enhance beginning teachers' learning in DI (Wertheim & Leyser, 2002) and teacher self-efficacy and affective commitment may reduce beginning teachers' intention to leave the profession (Billingsley, 2004; Hong, 2012). Following the JD-R model the assumption can be made that psychological states of teachers partially mediate the influence of school factors on professional learning in DI and turnover intentions of beginning teachers (Bakker et al., 2003; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007). However, as systematic research in the educational field that examines school factors and teachers' psychological states in combination is missing, this dissertation will examine how PLCs and

teacher autonomy as school factors, in combination with the teachers' psychological states 'teacher self-efficacy' and 'affective commitment' affect beginning teachers' professional learning in DI and their intention to leave the job.

To further enhance our understanding of both beginning teachers' professional learning in DI and their intention to leave the job we included other school and contextual factors that are considered to be relevant for these outcomes. More specifically, school leadership, school DI policy, educational type, and diversity in student population have been identified in the literature as important factors for DI implementation and for teachers' professional learning (e.g. Beecher & Sweeny, 2008; Hazel & Allen, 2013; Hertberg-Davis & Brighton, 2006). Moreover, other factors outside the school might also support beginning teachers' professionalization in DI and prevent beginning teachers to leave the profession. As such, teacher education is considered as a valuable contextual factor for beginning teachers' professional learning in DI. In addition, we put forward job insecurity as a contextual factor of particular interest in the decision processes of beginning teachers to leave the job.

Finally, this dissertation reflects on how PLCs are built in schools. Changing a school to a well-functioning PLC is not something that will happen overnight. According to Stoll et al. (2006) specific school conditions can facilitate this process of PLC development. Hence, to deepen the understanding in which way PLCs will have an impact on beginning teachers' outcomes, this dissertation will investigate how school conditions support the development of PLCs. Consequently, the general aim of this dissertation is threefold:

1) How are PLCs, other relevant school factors, teacher education, and teacher self-efficacy related to beginning teachers' learning in DI?
2) How are PLCs, teacher autonomy, job insecurity, and teachers' psychological states related to beginning teachers' intention to leave the job?
3) As PLCs are a key concept in both research aims, we also want to analyze how PLCs are developed in schools and which school conditions support this development.

In the following paragraphs, a guiding framework for the studies conducted in this dissertation is introduced (see Figure 1). Attention is paid to school factors – with professional learning communities as a key school factor of this dissertation –, contextual factors, teachers' psychological states, and teacher outcomes.

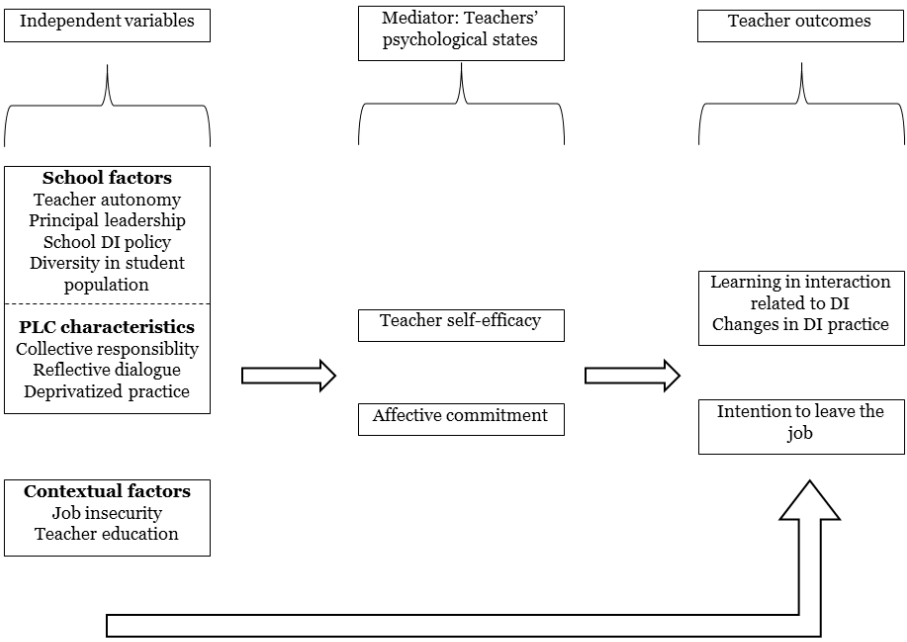

Figure 1. A guiding framework linking the variables studied in this dissertation

Conceptual framework

Professional learning communities (PLCs)

In the past three decades, the concept of professional learning community (PLC) that emerged from the school improvement literature, has gained considerable momentum in the educational field. The first conceptualizations of PLCs go back to the 1980s. PLCs were then conceived as a single-dimension community concept to capture the sense of community – broadly described as the sense of common purpose among teachers – within

schools (Bryk & Driscoll, 1988; Newmann, Rutter, & Smith, 1989). After the 1990s, the multidimensional perspective on PLCs started to become the dominant view and several different PLC characteristics were introduced as subdimensions to understand the PLC concept. While the multidimensional nature of the PLC concept was now studied in a more systematic manner, not all conceptual issues with regard to the PLC concept were resolved (e.g. Lomos, 2012; Stoll et al., 2006). The conceptual unclarity remained because multiple theoretical perspectives on PLCs delineated the boundaries of the concept in various ways. Some theorists proposed more broad descriptions of PLCs that included facilitating school conditions (e.g. supportive and shared leadership and respect) as part of the PLC concept (Halverson, 2007; Hipp & Huffman, 2003). Other theorists, however, have put forward more focused definitions considering school conditions as external facilitators of PLCs (e.g. Louis, Dretzke, & Wahlstrom, 2010; Wahlstrom & Louis, 2008). In recent years, this latter more narrow definition of PLCs is increasingly adopted in empirical research. These definitions typically include behavioral and normative features that represent the PLC concept (Bryk, Camburn, & Louis, 1999; Lomos, 2012; Stoll et al., 2006).

Behavioral features of PLCs refer to the social interactions and collaborative activities among teachers within the school environment. Several behavioral features have been proposed in the PLC literature, namely reflective dialogue and deprivatized practice. First, PLCs often focus on *reflective dialogue*. Reflective dialogue refers to the extent to which teachers engage in professional dialogues with colleagues about education-related issues such as instruction, curriculum, and student development (Newmann, Marks, Louis, Kruse, & Gamoran, 1996; Newmann & Wehlage, 1995; Wahlstrom & Louis, 2008). A second behavioral feature is *deprivatized practice*. Deprivatized practice means that teachers get the opportunities in PLCs to visit each other's classroom to observe teaching practices with the aim of giving and receiving feedback (Kruse, Louis, & Bryk, 1995; Wahlstrom & Louis, 2008).

The normative features of PLCs refer to basic conditions that are necessary for the behavioral features – reflective dialogue and deprivatized practice – to have an effect on professional behavior (e.g. Louis & Kruse, 1995; Stoll et al., 2006). A first prominent normative feature that is frequently adopted in studies concerning PLCs is *collective responsibility* and refers to the degree of mutual commitment of members of the school team to student learning and success (Louis & Marks, 1998). School members typically create this joint sense of responsibility and commitment by discussing the possibilities to stimulate students' intellectual growth and development (Newmann & Wehlage, 1995; Stoll et al., 2006; Wahlstrom & Louis, 2008). Lastly, some researchers also distinguish *shared values and vision*, which refers to the level to which professionals agree with the schools vision toward student learning, as a normative feature. However, there is some disagreement in the literature on the position of shared values and vision. Some scholars have defined shared values and vision as a supportive leadership condition instead of a PLC characteristic. These researchers assign principals the responsibility to develop a vision of student learning that is shared by the teaching team and based on consensus regarding common interests and goals (DuFour, DuFour, & Eaker, 2008; Fullan, 2006; Senge, 2006). Others have stated that shared values and vision coincides with collective responsibility and should therefore not be considered as a separate PLC characteristic (Bryk et al., 1999). As we want to present a PLC concept that is as clear as possible, we validated the PLC concept in chapter 2.

Together with the process of uncovering the abovementioned distinctive PLC characteristics scholars increasingly agreed that a PLC exists within a school when a group of professionals critically share and question their practice in an on-going, reflective, collaborative, and inclusive way with a unified focus on professional growth of teachers and students' learning (Stoll & Louis, 2007b). However, the 'group of professionals' that belong to a PLC also has been a topic of substantial debate. Initially, only teachers were considered as valid actors that could make a difference to the learning of both students and

colleague-teachers. Recently, more inclusive perspectives on membership in PLCs have been advocated such that the supporting staff is regarded as an essential actor in PLCs (Hopkins, Stringfield, Harris, Stoll, & Mackay, 2014; Stoll & Louis, 2007b). Several authors also noted that the level of education strongly determines the relevant actors within a PLC (Lomos, 2012; Stoll & Louis, 2007b). In primary schools, it is more likely that PLCs exists at the school level. This is because primary schools typically have a rather small school team that focuses on sharing knowledge about pedagogy and the developmental needs of children. In secondary schools, however, PLCs are often situated on the subject department level. This is because secondary schools are usually larger in size and also the structure hampers school-wide collaboration (Lomos, 2012; Louis & Marks, 1998). Furthermore, subject knowledge takes priority in secondary schools. As such, a various group of professional staff members responsible for coordinating the subject curriculum represent the most common PLC units in secondary education (Visscher & Witziers, 2004). However, as we focus in this dissertation on primary schools, the entire school team is considered as the unit of a PLC.

Investigators also have started to explore school conditions that are important to develop and facilitate PLCs (e.g. Stoll et al., 2006). Behind the suggested school conditions, two dimensions, namely the structural and cultural dimension, which are previously detected in the educational change and school improvement literature may be useful to zoom in on the development of PLCs (Stoll, 1999; van den Berg, Vandenberghe, & Sleegers, 1999).

First, the structural dimension stresses the importance of a rational, systematic, and coordinated strategy to conduct change and is featured by formalised structures and procedures (van den Berg et al., 1999). Providing time for people to discuss issues and restructuring existing arrangements are perceived as crucial structural school conditions shaping the organizational capacity of schools to develop a PLC (Sleegers, den Brok, Verbiest, Moolenaar, & Daly, 2013; Stoll, 1999).

Second, the cultural dimension advocates more organic forms of cooperation and collaboration (van den Berg et al., 1999). Cultural school conditions, characterized by cohesion, trust, and informal communication, increase the social capacity of schools, which is essential to create a PLC (Kruse et al., 1995).

As authors suggested that evaluating the success of PLCs depends on their stage of PLC development (Mulford, 2004) we specifically examined in one of our studies (chapter 4) how the abovementioned structural and cultural school conditions are generated in schools and how these conditions are linked to the different stages of PLC development.

School factors

Notwithstanding scholars support the importance of school factors such as teachers' collaboration within a PLC for teacher outcomes, research has addressed the value of providing teacher autonomy in the work environment (Huberman, 1993). Moreover, a crucial role is given to the school leader in stimulating school improvement and teachers' professional learning (Schleicher, 2012; Supovitz, Sirinides, & May, 2010). In addition, the opportunities which school policy can provide for teachers to learn seem promising for their practice and for student achievement. More specifically, the values, beliefs, mission statement, and policy plans can structure a coherent school policy which can enhance PLC development and stimulate a more focused professionalization of teachers (Cohen & Hill, 2000). Finally yet importantly, diversity in student populations can be of key importance in teachers' use of DI (e.g. Jackson, 2005).

Teacher autonomy

The relevance of PLC does not wipe out the need of teachers to work autonomously. Scholars have argued for a balance between collaboration and teacher autonomy (Toole & Louis, 2002). Teacher autonomy, which is defined as the space teachers get to be self-determined and experience more ownership, appears to be essential for teachers' professional growth and personal well-

being (Pearson & Moomaw, 2006; Ryan & Deci, 2000). According to, Pearson and Moomaw (2005) schools who provide teacher autonomy allow teachers to choose their own learning path of professionalization and directly impact their classroom practice. Additionally, research showed that the higher teachers' sense of autonomy is, the more likely teachers are to change and support change processes (e.g. Common, 1983). Furthermore, research has touched on the importance of teacher autonomy for their intention to stay in the teaching profession (Ingersoll & May, 2010; Johnson, 2006). However, research that investigates the combination of PLC characteristics and autonomy in relation to teacher outcomes is limited. Therefore, more research is needed to get insight in how teacher collaboration and autonomy are related to one another and which role this combination plays for teacher outcomes.

Principal leadership

Leadership by principals is of key importance in the school improvement literature (Leithwood, Seashore Louis, Anderson, & Wahlstrom, 2004). In particular, scholars indicated that school leaders play a pivotal role in the entire process of DI implementation and DI learning of teachers (Hertberg-Davis & Brighton, 2006; McAdamis, 2001; Tomlinson, Brimijoin, & Narvaez, 2008). However, different perspectives on how principals support the learning process of teachers exist.

In the first perspective, researchers believe that principals' leadership is directly related to teachers' professionalization in DI. The findings of a study by Hertberg-Davis and Brighton (2006) for instance showed that principals, who understand that DI is a long-term process and hold high but realistic expectations for their teachers related to DI, have a direct impact on teachers' willingness and ability to differentiate instruction. Also, Tomlinson (1999b) stated that principals must encourage teachers to apply DI with flexibility, creativity, and choice and help them to manage and plan DI in the classroom.

In the second perspective, researchers suggest that principals contributed to school improvement and teachers' professional learning related to DI in an indirect way by shaping the nature of the school conditions that can

develop a PLC (Leithwood et al., 2004). More specifically, Smit and Humpert (2012) found that principal leadership indirectly influenced professional learning in DI via the relationship with team culture. As such, according to these researchers, school leaders need to focus on creating a formalized structure for communication among the members of the school team and structurally monitor the implementation of the school policy (van den Berg et al., 1999). In addition, school leaders need to build a school culture by creating an environment of mutual responsibility, sustain a vision on schooling, and share leadership functions so that teachers can function in the position of a teacher leader (Kruse & Louis, 2009). In this perspective, principals' leadership can either facilitate or hinder the development of PLCs and in turn foster DI learning of teachers. Hence, taken into account these two perspectives on principal leadership and DI learning of teachers further research is needed to clarify which particular role principal leadership plays in beginning teachers' professionalization in DI.

School policy related to DI

As previously suggested, developing a school policy related to DI can foster beginning teachers' professional learning in DI. According to Kotter (2007) developing a sensible vision helps to clarify the direction in which an organization wants to move. During this process it is important that the entire teaching staff discuss the theoretical and practical definition of DI and set clear expectations on how DI has to be realized in practice (Beecher & Sweeny, 2008; Holloway, 2000; Mills et al., 2014). Researchers argued that a policy document or instructional plan needs to be set up from the moment a shared DI vision is developed in order to facilitate DI implementation (Lawrence-Brown, 2004). Besides creating a DI vision and developing policy documents, it is equally important to maintain the vision. Here, it is essential that schools take sufficient time to make sure that the next generation of teachers internalize the DI vision of the school (Holloway, 2000; Kotter, 2007). If schools succeed to build a vision that is accepted among the teaching team, teacher collaboration and the development of a PLC can be boosted (Hopkins & Stern, 1996). Thus,

in this dissertation, 'creating and maintaining a DI vision' and 'policy documents toward DI' are considered as supportive factors for PLC development and beginning teachers' professionalization in DI. In Flanders, alternative schools are in particular successful in developing a strong vision related to DI (Flemish Department of Education and Training, 2014). In the literature, alternative schools are known for their strong pedagogical vision that accommodates diverse learning trajectories for students and the high commitment of the teachers toward this pedagogical vision (Hazel & Allen, 2013). More concrete, alternative schools are based on specific pedagogical approaches differing from that of the mainstream pedagogy applied in traditional schools. Educational ideas and teaching philosophy of theorists such as Montessori and Freinet lie at the heart of alternative schools or they are focused on experienced-based education (Eurydice, 2013; Flemish Department of Education and Training, 2014). Some studies revealed that alternative schools make more use of DI forms in comparison with traditional schools. A study by Rathunde and Csikszentmihalyi (2005) for example shows that Montessori students spent more time on collaborative work and individual projects than traditional students. Likewise, Verhaeghe and Gadeyne (2004) found that kindergarten teachers of Freinet schools are more willing to include children with disabilities into their classrooms and more frequently install learning centers than kindergarten teachers of traditional schools. In this regard, educational type (i.e. teaching in alternative or traditional schools), as a school factor related to school DI policy, is of particular interest in this dissertation.

Diversity in student population

There is evidence that when a school is sensitive to the culture of their students, minority students participate more actively in the classroom and perform better (Foster, 1995; Gay, 2000; Jackson, 2005; Yen, 2009). More specifically, Beecher and Sweeny (2008) revealed that DI reduces the achievement gap between students from high and low socioeconomic status families and enhance student performance. The abovementioned studies

emphasize the importance of the use of DI in schools with students of diverse backgrounds and suggest that teachers in those schools will be challenged more to provide highly elaborated DI forms. However, research that explores the relationship between diversity in student populations within schools and beginning teachers' learning in DI is scarce. Therefore, we included diversity in student population as a variable in this dissertation.

Contextual factors

Schools have great potential to foster the learning processes of beginning teachers in DI. However, contextual factors also seem to influence beginning teachers' learning and their intention to leave the job. As previously mentioned, teacher education is selected as a contextual factor that might foster beginning teachers' learning processes in DI (Tomlinson, 1999a). Furthermore, job insecurity may affect beginning teachers' intention to leave the job (Devos & Vanderheyden, 2002; OECD, 2005).

Teacher education

In 2006, one of the policy priorities of the Flemish department of education was supporting preservice teachers to deal with a diverse student population. Accordingly, new general standards with a stronger focus on DI were installed for students graduating from initial teacher training programs. These basic competencies related to DI, are formalized in the profession profile, representing the knowledge, skills, and attitudes that graduate students have to comply in order to fully function as a beginning teacher in a school context (Aelterman, Meysman, Troch, Vanlaer, & Verkens, 2008). Consequently, teacher training programs in Flanders endeavor to develop preservice programs that provide a meaningful understanding of DI and offer preservice teachers the first opportunity to develop teaching skills and familiarize with DI. According to Goodnough (2010) these types of preservice programs introduce a variety of strategies to prepare students better for tailoring their lessons to the individual needs of the students. Being part of such a program did not only increase beginning teachers' awareness of adapting classroom practices but

also enhance their understanding of the needs of learners (Tomlinson, 1999a). As teacher training programs shape beginning teachers' educational views and beliefs with regard to DI, teacher training programs can play an ongoing role in the professional learning of beginning teachers. However, few studies examined in which way preservice programs make a difference in engaging beginning teachers in their professionalization in DI. As such, beginning teachers' perceptions about the impact of the teacher training program on their positive attitude toward DI are integrated in our analyses on DI learning of beginning teachers.

Job insecurity

In Flanders, beginning teachers face a lot of job insecurity at the start of their teaching career (Devos & Vanderheyden, 2002). New teachers are always given a temporary position and need to teach for several years before they get tenured (Flemish Department of Education and Training 2013). Furthermore, very often beginning teachers in Flanders need to switch schools (Crevits, 2014). These insecurities make it more likely for Flemish beginning teachers to quit teaching. Meta-analytic review studies by Sverke, Hellgren, and Naswall (2002) and Cheng and Chan (2008) indicated that employees' job insecurity lead to higher levels of turnover intentions. This relationship was stronger for younger employees and employees with a shorter tenure than for older employees and those with longer tenure (Cheng & Chan, 2008). Some educational studies showed that job insecurity is an important motive to leave teaching (Ruvio & Rosenblatt, 1999; Struyven & Vanthournout, 2014). However, how job insecurity affects beginning teachers' turnover intentions remains underexplored. As beginning teachers in Flanders are confronted with high levels of job insecurity this variable is put forward in this dissertation.

Teachers' psychological states

In the first section of this chapter, we introduced the JD-R model of Bakker and Demerouti (2007). At the heart of the JD-R model lies the assumption that job resources, such as work autonomy and collegial support,

evoke underlying psychological processes. One of these processes generates the motivational hypothesis. This motivational hypothesis proposes that job resources can affect psychological states such as self-efficacy and affective commitment. The JD-R model indicates that both self-efficacy and affective commitment may foster employees' professional growth and reduce their turnover intentions (Bakker et al., 2003; Xanthopoulou et al., 2007). More specifically, support from colleagues can provide the necessary self-confidence to beginning teachers. As they are accepted by their colleagues and join their dialogues and consultations, their belief that they have the necessary competence to meet the challenges they face might grow. When beginning teachers experience an important degree of autonomy, they can find their own way to implement the shared ideas and reflections of their colleagues, which in turn might increase their feeling of competence. Simultaneously, the collegial support can stimulate the feeling that they are part of a team. This might lead to a higher commitment toward this team.

Teacher self-efficacy

Bandura (1997) defined self-efficacy as a set of beliefs that people create about their ability to achieve desired outcomes. From this perspective, efficacy beliefs determine how environmental opportunities are perceived, which activities people will select, how much effort is spent on an activity, and how strong people persist when confronted with obstacles. Self-efficacy is grounded in the social cognitive theory that represents a causal model of dynamic and reciprocal interactions between 1) environmental factors, 2) personal factors in the form of cognitive, affective, and biological events, and 3) behavior. According to Bandura (1977, 1997) self-efficacy may mediate the relationships between environmental contexts, such as school contexts, and how people feel, think, and act. In this way, it tries to explain and predict how people acquire and maintain certain behavioral patterns. Furthermore, Xanthopoulou et al. (2007) provided evidence for the mediating role of self-efficacy in the JD-R model. The results of their study showed that the supply of job resources activates the self-efficacy of employees. In turn the more confident employees

are, the more they are proud of the work they do. These findings suggest that self-efficacy should not be neglected in explaining personal growth and performance of employees.

In relation to turnover intentions, Avey, Luthans, and Jensen (2009) suggested that mediating variables such as self-efficacy might play a key role in understanding the variation in perceived symptoms of stress and intentions to quit. Also, Demerouti and Bakker (2011) stated that future research with the JD-R model as theoretical framework is needed to examine the complex interaction between job resources, such as support from colleagues and work autonomy, and self-efficacy in relation to outcomes such as intention to leave the job. A deeper understanding of the mediating role of self-efficacy is crucial to get insight in the steps that lead to beginning teachers' professional learning in DI and their intention to leave the job. Hence, teacher self-efficacy is included as a potential mediating factor in this dissertation.

Affective commitment

The JD-R model also provides a theoretical framework for the mediating role of affective commitment in explaining teachers' intention to leave the job. In particular, Bakker, Demerouti, and Schaufeli (2003) found that employees who can draw upon job resources such as support from colleagues feel more committed to their organization, and, consequently, have lower intentions to leave the job. We specifically decide to integrate affective commitment, which refers to the emotional attachment and involvement of the employees to their organization, in this dissertation based on the results of previous studies (e.g. Meyer, Stanley, Herscovitch, and Topolnytsky, 2002). The study by Meyer et al. (2002) took into account three forms of organizational commitment, namely affective, continuance, and normative commitment. Based on their findings, Meyer et al. (2002) conclude that affective commitment has the strongest correlation with turnover intentions and is the most appropriate form of organizational commitment to predict teachers' turnover intentions.

Teacher outcomes

As previously stated, this dissertation focused on two major outcome variables namely beginning teachers' professional learning in DI and their intention to leave the profession. Both teacher outcomes are expected to be influenced by PLC characteristics, other school factors, contextual factors, and teachers' psychological states.

Professional learning activities related to DI

Recently, there is a call from policy makers to address the needs of academically diverse students, and this prompts teachers to apply DI in the teaching practice (e.g. Humphrey et al., 2006). In the literature, scholars indicated that DI is a complex concept (e.g. Fogarty & Pete, 2011). However, research in the field of DI identified four key elements, namely flexibility in the content, process, product, and classroom routines and compositions to define the DI concept (Rock, Gregg, Ellis, & Gable, 2008; Smit & Humpert, 2012; Tomlinson, 2001; Tomlinson & Imbeau, 2010). First, the content covers what teachers teach and what the students need to learn. To realize flexibility in the content, teachers can adjust their lesson materials to the readiness levels of the students (Algozzine & Anderson, 2007; Tomlinson, 2001). Second, the process depicts how teachers teach and how students learn. Students differ in their learning process. Hence, teachers need to be flexible in the instructional methods and the level of support they offer to their students (Landrum & McDuffie, 2010; Rock et al., 2008; Tomlinson, 1999a). Third, the product encloses the way students show what they have learned, or in other words demonstrate their mastery of the knowledge or skills. In practice, flexibility in assessment is required to meet the diverse needs of the students (Levy, 2008; Tomlinson & Imbeau, 2010). Lastly, a variety in classroom routines and compositions embodies the DI concept. From this perspective, teachers are seen as coaches who generate flexibility in grouping students such as ability grouping. Furthermore, instruction can be given to the entire class, small groups, or the individual student (Tomlinson, 2005; Tomlinson & Kalbfleisch, 1998).

Flemish teachers in mainstream education have also been confronted with the demand to apply DI in the classroom practice. The Flemish government has been urging mainstream education by decree since 2008 to give students with special educational needs reasonable adjustments. In 2014 the Flemish government intensified the request to teach in a differentiated manner by approving the M-Decree that enables students with a disability to attend classes in mainstream education. This process of adapting the content, process, and product to the needs of each individual student within a diverse group requires teachers to acquire new teaching skills, develop new knowledge, and take on new teaching roles to put DI in practice (McLaughlin, 1997; van de Grift, van der Wal, & Torenbeek, 2011). As a result of these changing expectations, the role of the teachers is also shifting from the dominant role of transmitter of knowledge to the role of coach who guides and supports the learning processes of students by creating diverse learning environments for students. Also in Flanders, the professional profile of teachers emphasizes the necessity that teachers can coach the learning and development processes of their students (Aelterman et al., 2008). To obtain these new skills and competencies related to DI an active, constructive, and long-term learning process need to be present in which teachers undertake professional learning activities to make improvement and change possible (Avalos, 2011; Meirink, Meijer, & Verloop, 2007). In particular, the professional development perspective on teacher learning offers an interesting approach to understand beginning teachers' learning in DI (Kwakman, 2003).

This perspective emphasizes that teachers are responsible for their own learning process. Moreover, it situates teachers' professional learning within schools and in classrooms (Putnam & Borko, 2000). Over the years, it has been increasingly acknowledged that professional learning of teachers is a social activity in which teachers must rely on the expertise and support of colleagues to adopt new teaching practices. As such, it is crucial that teachers regularly discuss their efforts to support student learning with other teachers and ask feedback (Borko, 2004; Glazer & Hannafin, 2006). However, researchers

stated that these professional learning activities, social in nature, need to be combined with professional learning activities situated in the classrooms. In particular, teachers need to experiment with alternative instructional methods and try out new teaching practices on their own (Zwart, Wubbels, Bergen, & Bolhuis, 2009). In her review of the literature on professional learning activities Bakkenes, Vermunt, and Wubbels (2010) also distinguished 'getting ideas from others' and 'experimenting' as two important categories of learning activities. As both categories have been seen as essential by different scholars in the general professional learning literature, this dissertation, which focuses on the professional learning in DI, considers 'learning in interaction related to DI' on the one hand and 'changes in DI practice' on the other as important professional learning activities for beginning teachers' learning in DI.

First, the professional learning activity *'learning in interaction related to DI'* can support teachers' learning. This professional learning activity incorporates the actions teachers carry out to obtain knowledge and feedback from colleagues (Holman, Epitropaki, & Fernie, 2001; Meirink et al., 2007; Van Eekelen, Boshuizen, & Vermunt, 2005). In turn, teachers can use the expertise gained in conversations with their colleagues to master new teaching skills (Borko, Mayfield, Marion, Flexer, & Cumbo, 1997; Van Eekelen et al., 2005).

Second, teachers can learn from their personal experience. In trying to apply DI, teachers can experiment with different classroom instructions and check how students react on these classroom instructions (Bakkenes et al., 2010; Geijsel, Sleegers, Stoel, & Krüger, 2009). As researchers have emphasized the importance of teacher learning in improving classroom instructions (Parise & Spillane, 2010) we selected *'changes in DI practice'* as a second professional learning activity. Changes in DI practice can be defined as how flexibly teachers adapt their classroom behavior to the individual needs of the students by using for instance new teaching techniques (Bakkenes et al., 2010). These changes in behavior focus on permanent changes and do not include temporary experiments.

Intention to leave the job

A second aspect that is challenging for the educational field and that is discussed in this dissertation, besides professional learning in DI, is the high turnover rate of beginning teachers. This turnover rate of beginning teachers is internationally perceived as problematic (Grissmer & Kirby, 1997). In Flanders, 13 percent of all elementary school teachers younger than 30 quit teaching within the first five years. In secondary education even 22 percent of all teachers younger than 30 leave teaching within the first five years (Flemish Department of Education and Training, 2013). The turnover of beginning teachers has specific implications for schools. First, turnover of beginning teachers can result in discontinuity of professional development. More concrete, if beginning teachers leave the teaching profession schools must dedicate extraordinary time to introduce graduated students to the teaching profession and the school organization year after year and support their professionalization (Allensworth, Ponisciak, & Mazzeo, 2009). Second, high turnover of teachers creates instability in schools, making it more difficult to have coherent instruction. This instability may specifically cause problems in schools trying to carry out reforms, as beginning teachers coming in each year are likely to repeat mistakes, rather than improve upon reform implementation (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2007). In this dissertation, the intention of beginning teachers to leave the profession will be integrated as a teacher outcome because teachers' intention to leave the job, which reflects an individual's intent to leave the profession in the near future, has been identified as the immediate precursor of turnover behavior (Lee & Mowday, 1987; Mobley, 1982; Pomaki, DeLongis, Frey, Short, & Woehrle, 2010).

Problem statement

A growing amount of research has examined how PLCs affect student learning and achievement. However, far too little attention has been paid on the relationship between PLCs and teacher outcomes, especially beginning teachers' outcomes. Based on the prominent challenges for the educational field we believe that there is an urgent need to get insights in how PLCs stimulate

beginning teachers' professional learning in DI and reduce their intention to leave the job. The current professional learning literature indicated that a PLC is a potential stimulating context for professional learning but research on how PLCs stimulate beginning teachers to undertake professional learning activities related to DI is missing (Vescio, Ross, & Adams, 2008). Furthermore, some studies started to examine the relationship between PLCs and teachers' turnover intentions (Boyd et al., 2011; Pogodzinski, Youngs, & Frank, 2013). However, little is known about the degree to which a PLC reduces beginning teachers' intention to leave the teaching profession.

In the literature, the complexity of the processes that lead to teachers' professional learning and teachers' turnover intentions is emphasized. In particular, scholars stated that many mechanisms, actions, and elements are involved in both teacher outcomes (Opfer & Pedder, 2011; Price, 2004). Still, research only fragmentary studied in which way the school and contextual factors matter for beginning teachers' professional learning in DI and their turnover intentions. Hence, as previously mentioned, we also included other school and contextual factors besides the PLC characteristics in our conceptual framework in order to get the full picture of which factors matter for beginning teachers' outcomes. More specifically, we considered teacher autonomy, school leadership, school DI policy, and diversity in student population as school factors, besides the PLC characteristics, and teacher education as a contextual factor that could support beginning teachers' professional learning in DI. Similarly, we introduced PLC characteristics and teacher autonomy as school factors that may buffer beginning teachers' intention to leave the teaching profession and job insecurity as a contextual factor that may enhance these turnover intentions.

Moreover, there is a lack of research on how teachers' psychological states are related to their professionalization in DI and their intention to leave the job. Findings by Xanthopoulou et al. (2007) suggested that self-efficacy mediates the relationships between job resources on the one hand and employees professional growth and their turnover intentions on the other hand.

In addition, a study by Bakker et al. (2003) revealed that the relationships between job resources and turnover intentions are mediated by affective commitment. However, more research in the educational field is essential to gain understanding in the mediating role of teachers' psychological states in explaining beginning teachers' outcomes.

A last element that needs more research is identifying facilitating conditions within schools that stimulate PLC development. Some exploratory studies introduced school conditions that facilitate the development of PLCs (e.g. Stoll et al., 2006). However, contemporary research in this domain specifically lacks in-depth qualitative research examining the school conditions that are relevant for building PLCs. In this dissertation, we hope to effectively respond to the needs we identified in this section.

Purpose of study

The general aim of this dissertation is to gain insight in the relationship between school and contextual factors on the one hand and teacher outcomes on the other hand. In this dissertation, special attention is given to the development of PLCs and the relationship between PLCs and beginning teachers' professional learning in DI and their intention to leave the profession. Based on the theoretical framework and the problem statement, this aim is divided into three research objectives (RO).

Research objective 1 (RO1): Examining the relationship between PLC characteristics, other relevant school factors (teacher autonomy, school leadership, school DI policy, and diversity in student population), teacher education, and teacher self-efficacy with beginning teachers' professional learning in DI.

Research objective 2 (RO2): Examining the relationship between PLC characteristics, teacher autonomy, job insecurity, teacher self-efficacy, and affective commitment with beginning teachers' intention to leave the job.

Research objective 3 (RO3): Investigating the PLC development in schools and exploring the factors that support schools to develop a PLC.

In order to meet these research objectives, several methods will be used in this dissertation. These methods will be described in the next paragraph.

Research design

For more than a century, scholars discuss the differences between quantitative and qualitative research. Researchers, like Creswell (2014), indicate that quantitative research focuses on "testing objective theories by examining the relationship among variables. These variables, in turn, can be measured typically on instruments so that numbered data can be analyzed using statistical procedures" (p. 4). Also, quantitative researchers make assumptions about testing theories deductively. As such, they try to determine if predictive generalizations of the theory, formulated in specific hypotheses, are true for a sample of the population. Consequently, quantitative researchers ask specific, narrow questions and collect quantifiable data from participants in order to be able to generalize and replicate the findings. Conversely, Creswell (2014) identifies qualitative research as "an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem" (p. 4). Hence, qualitative researchers typically collect data in the participant's setting, analyze data inductively building from particulars to general themes, and make interpretations of the meaning of the data. Qualitative researchers also aim to seek the meaning of what is observed, resulting in a deeper and richer understanding of social or human problems.

Traditionally, quantitative research is identified as the opponent of qualitative research. However, more recently, a shift in views occurs and these two approaches of research are described as a continuum with quantitative research anchored at one pole and qualitative research anchored at the other pole. More and more researchers emphasized that both quantitative and qualitative research are equally important and useful. Therefore, a growing trend for methodological triangulation emerged (Denzin, 2009). More concrete, to minimize weaknesses of single research studies and complementary strengths of both quantitative and qualitative research, scholars use more than one method to gather data and for instance conduct interviews as well as

retrieved documents and ask people to fill out questionnaires (Johnson & Onwuegbuzie, 2004; Morse & Niehaus, 2009). Following this recommendation, the present dissertation uses both quantitative and qualitative research methods in order to meet the research objectives.

The results presented and discussed in this dissertation are reflected in four studies (see Table 1). We used quantitative methods in Chapter 2, 3, and 5 to test the hypothetical models developed to explain beginning teachers' professional learning in DI and their turnover intentions. Of these three studies, two studies are entirely based on questionnaires administered to all beginning teachers who had at least three months of teaching experience in the participating school and had been working for maximum five years in the school. This part of the dissertation offers a statistically significant pattern of relationships between the selected variables that, to a certain extent, explains beginning teachers' intention to leave the profession and their professionalization in DI. In Chapter 3, we also converted qualitative data (i.e. policy documents) into a nominal variable. Onwuegbuzie and Teddlie (2003) identified this stage as data transformation. The developed nominal variable is correlated with the quantitative data, namely the questionnaires, that were collected simultaneously.

Next, we used a qualitative research design in Chapter 4 to investigate more in-depth the complexity of the study variables. In this chapter, quantitative data for critical case sampling was used to increase data richness around the preliminary quantitative results. As such, we seek elaboration, enhancement, illustration, and clarification of the results from one method with results from the other method (Creswell, 2008). In this qualitative study school leaders, special needs coordinators, and beginning teachers were interviewed. An overview of the methodology, different research designs, and the variety of research techniques of this dissertation in relation to the research objectives is provided in Table 1.

Table 1. *Overview of the research objectives, the methodology, the research designs, and the research techniques for the different chapters*

Chapter	Research objective	Methodology	Research design	Research techniques
1			Chapter 1: General introduction	
2	RO1	Quantitative research	Teacher survey (n = 227)	EFA, CFA (SPSS/R), Path analysis (R)
3	RO1	Quantitative research	Teacher survey (n = 272)	Multilevel analyses (MLwiN)
		Qualitative research	Policy documents toward DI of 31 schools	Within-case analyses (Nvivo)
4	RO3	Qualitative research	Interviews with 3 school leaders, 3 special needs coordinators, and 8 beginning teachers	Within-case and cross-case analyses (Nvivo)
5	RO2	Quantitative research	Teacher survey (n = 272)	EFA (SPSS), Path analysis (R)
6			Chapter 6: General discussion and conclusion	

In two of the three quantitative studies (Chapter 2 and 3), there is a common focus on the first research objective, namely examining the relationship between PLC characteristics and other relevant school and contextual factors with beginning teachers' professional learning in DI. Chapter 2 investigated the influence of PLC characteristics and teacher autonomy, as hypothesized supportive school factors, on the teacher outcome 'changes in DI practice'. This chapter also offers an insight in how the relationships between PLC characteristics and teacher autonomy are mediated by teacher self-efficacy. Questionnaires were used in this chapter to collect data from primary beginning teachers (n = 227) in their schools (n = 65). In Chapter 3, the relationships between the school and contextual factors and the two teacher outcomes related to DI (i.e. learning in interaction and changes in practice) are examined. In particular, the PLC characteristics, school leadership, school DI policy, and diversity in student population were included as school factors that might stimulate beginning teachers' professional learning in DI. Furthermore, teacher education was integrated in this study as a contextual factor that could support beginning teaches in dealing with DI implementation in the classroom practice. For Chapter 3, data were collected in 72 primary schools through policy documents (n = 31) and teacher questionnaires (n = 272).

In order to gain insights for the second research objective, a quantitative study based on teacher questionnaires (n = 272) is undertaken and described in Chapter 5. This chapter elaborates on the investigation of how important school (i.e. PLC characteristics and teacher autonomy) and contextual (i.e. job insecurity) factors are for beginning teachers' turnover intentions. Moreover, this chapter explores the mediating role of beginning teachers' psychological states (teacher self-efficacy and affective commitment) in explaining the relationships between PLC characteristics, teacher autonomy and the intention to leave the job of beginning teachers.

For the first and second research objective exploratory and confirmatory factor analyses were conducted to check the construct validity of

the scales. In addition, multilevel modeling techniques and path analyses were used to analyze the data.

The third research objective is tackled with a qualitative study (Chapter 4). This qualitative study took place in three primary schools selected through critical case sampling, based on the quantitative results from Chapter 2. The first aim of this study was to investigate the PLC development in schools. Second, we want to uncover the conditions within schools that facilitate PLC development in schools. In the qualitative study, beginning teachers, special needs coordinators, and principals of these three schools were interviewed. Within- and cross-case analysis was used to develop conceptual insights.

Overview of the dissertation

The dissertation is structured into six chapters. Apart from the introductory chapter (Chapter 1) and the concluding chapter (Chapter 6), all chapters document on different empirical studies and are based on a published or submitted article in an international peer-reviewed journal. In Figure 1, the overarching structure of this dissertation is given. As such, Figure 1 represents a guiding framework for this dissertation and illustrates how the various studies in this dissertation are interconnected. Hence, the guiding framework will be repeated before each chapter and the specific elements under study for the relevant chapter will be highlighted.

Chapter 1 provides a general introduction for this dissertation. In this chapter, the conceptual framework and research objectives are outlined. Furthermore, the research design is specified and an overview of the studies included in the dissertation is presented.

Chapter 2 *'The importance of job resources and self-efficacy for beginning teachers' professional learning in differentiated instruction'* aims to investigate the degree to which teacher autonomy, the PLC characteristics, and teacher self-efficacy are associated with beginning teachers' changes in DI practice. A path analysis based on the questionnaires of 227 beginning teachers out of 65 primary schools is conducted to test the relationships. The results of

this chapter are presented in an article that was published in *Teaching and Teacher Education*.

In Chapter 3 entitled *'The relationship between teacher education, school factors, and beginning teachers' professional learning related to differentiated instruction'* multilevel analyses were used to explore the relationship between PLC characteristics and other potential supportive school and contextual factors on the one hand and learning in interaction related to DI and changes in DI practice on the other hand. The data collection process took place in two stages. First, we retrieved policy documents (n = 31) that describe the school's view on DI. Second, we administered surveys to beginning teachers. Beginning teachers (n = 272) of 72 Flemish primary schools filled out our questionnaire. The manuscript of this chapter has been published online in *School Effectiveness and School Improvement*.

Chapter 4 *'How do professional learning communities aid and hamper professional learning of beginning teachers related to differentiated instruction?'* zooms in on the contribution of a supportive school environment to beginning teachers' application of differentiated instruction in their classrooms. The starting point of this chapter was the professional learning of beginning teachers based on high, medium, and low scores on the scale 'changes in DI practice' developed in Chapter 2. A comparative analysis of three selected schools differing in their levels of beginning teachers' professional learning in DI was carried out. Data for this study were collected through semi-structured interviews with school leaders, special needs coordinators, and beginning teachers. This chapter intends to provide an insight in how differences in PLC development influence the learning processes of beginning teachers in DI. Furthermore, this study explores how structural and cultural school conditions support PLC development. Chapter 4 is based on a manuscript that is accepted for publication in *Teachers and Teaching: Theory and Practice*.

Chapter 5 *'How green is the grass on the other side? Exploring the intention of beginning teachers to leave the teaching profession'* examines the

motivational processes of beginning teachers to leave the job. This chapter presents the results of a path analysis (n = 272) that integrates the independent variables namely the PLC characteristics, job insecurity, and teacher autonomy. Also, the interrelation of several teachers' psychological states (i.e. teacher self-efficacy and affective commitment) and the previously mentioned independent variables is investigated and discussed. This chapter is submitted to *European Journal of Teacher Education*.

The last chapter, Chapter 6 synthesizes and integrates the findings of the preceding chapters and offers a general conclusion and discussion, related to the research objectives. This chapter includes a discussion of the limitations of the dissertation and possible directions for future research. Finally, implications for theory and empirical research as well as implications for practice and policy are addressed.

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Chapter 2

The importance of job resources and self-efficacy for beginning teachers' professional learning in differentiated instruction[1]

Abstract

Professional learning in differentiated instruction (DI) is a challenging learning process for beginning teachers. This study investigates the interplay between job (i.e., teacher autonomy and characteristics of professional learning communities (PLCs)) and teacher self-efficacy as hypothesized determinants of professionalization in DI (see Figure 1). A sample of 227 beginning teachers from 65 primary schools participated. Path analyses showed that the PLC characteristic 'reflective dialogue', teachers' self-efficacy and autonomy directly predicted changes in DI practice (i.e., measure of professional learning in DI). Moreover, teacher autonomy and the PLC characteristic 'collective responsibility' indirectly predicted changes in DI practice via teacher self-efficacy. Implications for educational practices are discussed.

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[1] Based on De Neve, D., Devos, G., & Tuytens, M. (2015). The importance of job resources and self-efficacy for beginning teachers' professional learning in differentiated instruction. *Teaching and Teacher Education, 47*, 30-41. doi:10.1016/j.tate.2014.12.003

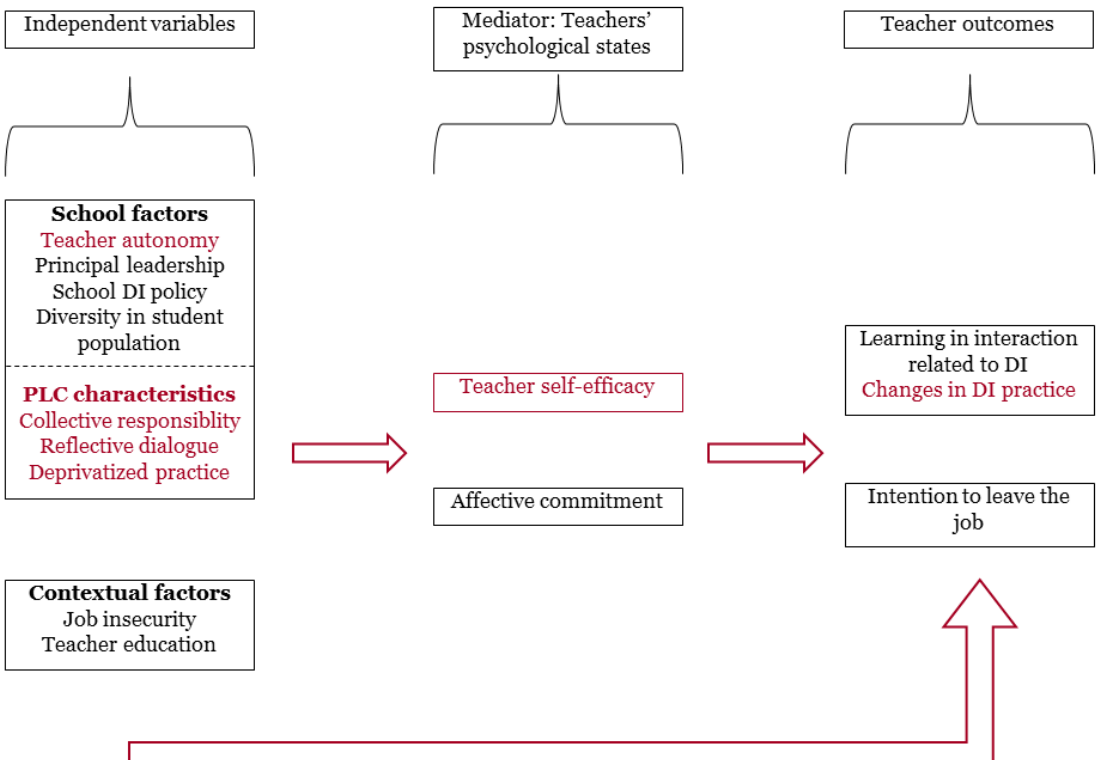

Figure 1. Chapter 2 situated in the guiding framework of this dissertation

Introduction

In recent years, there is a consensus among scholars on the importance of teachers' professional learning to improve the quality of education (Darling-Hammond, Chung Wei, Alethea, Richardson, & Orphanos, 2009). Along their teaching career, teachers learn and professionalize in different ways as they encounter different experiences, challenges, and problems. In particular, the professional learning of beginning teachers is considered as complex and demanding (Avalos, 2011; OECD, 2005). Whereas beginners in other fields start with minor responsibilities and gradually get more demanding challenges and duties along their path of professionalization, beginning teachers immediately have full pedagogical and legal responsibility (Kelchtermans & Ballet, 2002; Tynjälä & Heikkinen, 2011).

One of the most challenging tasks beginning teachers face nowadays is the implementation of differentiated instruction (DI) in the classroom practice (Smit & Humpert, 2012; Tomlinson et al., 2003). DI is defined as a pedagogical approach to teaching and learning that aims to obtain a match between learning tasks and activities on the one hand, and the needs of individual learners on the other hand, to maximize students' growth (Levy, 2008; Stradling & Saunders, 1993; Tomlinson, 1999). Currently, teachers are increasingly confronted with diverse student populations. Learners do not only differ culturally and linguistically but also in their cognitive abilities and learning preferences (Huebner, 2010; Jokinen, Heikkinen, & Morberg, 2012). This evolution resulted in a call from policymakers and researchers to implement a differentiated teaching approach into the classroom. Also in Flanders (Belgium), were special needs education and mainstream education was strongly separated up to now, this trend is visible. Year after year the PISA-results show that there is a tremendously big gap between high-performing and low-performing students within Flanders. This implies that equity in learning opportunities is low for Flemish students (OECD, 2013). This finding reaffirms that Flemish teachers struggle with the use and implementation of DI within the classroom. Since 2008, the Flemish government has been urging

mainstream education by decree to give students with special educational needs reasonable adjustments. The M-Decree approved by the Flemish government in 2014, enables students with disabilities to follow classes in mainstream education. These political regulations make the call for DI even stronger.

Given that implementing DI places new requirements on teachers' skills, this process of adapting the course content to the needs of each individual student within a diverse group coincides with many difficulties, especially for beginning teachers (Holloway, 2000). In trying to apply DI, beginning teachers experience what Bakker and Demerouti (2007) have identified as a high job demands environment where novice teachers are confronted with work overload and time pressure. Although scholars acknowledge the benefits of DI for student learning, they have doubts about the feasibility to plan different forms of instruction for a diverse group of learners. Integration of DI in lesson plans is time-consuming and difficult to accomplish without assistance from colleague-teachers (Smit & Humpert, 2012; Tomlinson et al., 2003). In addition, Flemish student teachers often feel not fully prepared to use DI when they enter the teaching profession because teacher training courses sometimes lack thorough DI examples (Ruys, Defruyt, Rots, & Aelterman, 2013). Therefore, understanding which factors facilitate professional learning in DI and buffer the high job demands is critical to understand how beginning teachers deal with this difficult challenge and how they can be supported.

This study aims to address this issue by focusing on factors that may play a role in the learning process of beginning teachers in DI. More specifically, this study investigates the interplay between school factors (i.e. teacher autonomy and characteristics of professional learning communities (PLCs)) and the psychological state 'teacher self-efficacy' as hypothesized determinants of professionalization in DI.

In their Job Demands-Resources (JD-R) model Bakker and Demerouti (2007) have indicated that a high demands work environment can be buffered with important job resources such as support from colleagues and work

autonomy. Various studies stated that PLCs have characteristics of collegial support that stimulate teachers' professionalization in DI (Vescio, Ross, & Adams, 2008; Wahlstrom & Louis, 2008). Furthermore, Xanthopoulou, Bakker, Demerouti, and Schaufeli (2007) extended the JD-R model by providing evidence that the mediating role of self-efficacy should not be neglected in explaining professional growth. However, systematic research on the mediating effects of teacher self-efficacy on the relationship between job resources and beginning teachers' learning in DI is missing.

As such, this study wants to analyze how job resources like teacher autonomy and PLC characteristics are related to professional learning of beginning teachers in DI and how self-efficacy plays a mediating role between these variables. A deeper understanding of the interplay between these variables can help us identify key elements in the way beginning teachers can be supported in dealing with DI.

Theoretical framework

Beginning teachers' changes in DI practice

The JD-R model puts forward job resources and self-efficacy as crucial factors that foster teachers' professional growth and learning (Bakker & Bal, 2010; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007). In the following section we will give a definition of professional learning and explain more in-depth the learning process we want to capture.

Professional learning of teachers in schools is regarded as crucial in improving the quality of education (Darling-Hammond et al., 2009). In this study we affiliate with Villegas-Reimers (2003) who perceived teachers' professional learning as a long-term, active, and constructive process that contains individual and collaborative components. During this process the pre-existing knowledge of teachers changes through individual experiences, but also through meaningful interactions with others taking place in a particular context.

Researchers have underlined the importance of teacher learning in improving classroom instruction (Parise & Spillane, 2010). According to Clarke

and Hollingsworth (2002) the identification of antecedents that support and promote teachers' learning is crucial to advocate teachers' changes in classroom practices. Hence, we consider the variable 'changes in DI practice' to comprehend the learning process of beginning teachers in DI. Changes in practice refer to the permanent behavioral changes teachers perceive in their classroom behavior, such as the use of new teaching techniques (Bakkenes, Vermunt, & Wubbels, 2010).

Job resources

As previously mentioned, work autonomy and support from colleagues are identified as important job resources within the JD-R model (Bakker & Demerouti, 2007). Previous studies have shown that teacher autonomy and collegial support affect teachers' learning (Geijsel, Sleegers, Stoel, & Krüger, 2009; Vescio et al., 2008). However, there is still little research that situates beginning teachers' learning in DI within the JD-R model. Therefore, we integrate teacher autonomy and characteristics of PLCs as job resources in this study.

Teacher autonomy

Teacher autonomy gives teachers the space to be self-determined and allows teachers to try out different ways of learning. They can choose their own learning path to develop themselves professionally, experience more ownership, and have a more direct impact on their changes in practice. In this study, we define teacher autonomy as teachers' feelings of personal control and the control they have on their work environment (Pearson & Hall, 1993). More specifically, teacher autonomy refers to the freedom teachers get to determine task-related characteristics such as (a) selecting their own teaching methods, strategies, and assessment activities, (b) scheduling the use of time in the classroom, (c) selecting student goals (Fireston & Pennell, 1993; Pearson & Moomaw, 2006).

Studies have shown that autonomy is positively related to teachers' learning and is an essential factor for teachers' use of professional practices

(Pearson & Moomaw, 2005; Porter, 1989). Also, Common (1983) observed that the higher teachers' sense of autonomy is, the more they are willing to change and support the change process. In addition, there is a growing body of literature indicating that teacher autonomy, as a job resource, stimulates teachers' performance (Bakker & Bal, 2010) and may buffer the impact of job demands on performance (Bakker & Demerouti, 2007). Kwakman (2001) examined the relationship between teachers' work stress, task characteristics, and teachers' learning. Findings indicated that teachers who experienced high emotional demands in combination with high work autonomy and participation, performed more frequently professional activities related to professional improvement. Despite this large body of research, there is, to the best of our knowledge, no research examining the impact of teacher autonomy on the changes of beginning teachers in DI practice. In line with prior research, we propose that: *'There will be a positive relationship between teacher autonomy and beginning teachers' changes in DI practice'* (hypothesis 1).

PLC characteristics

In the 21st century teachers' professional learning does not take place in a vacuum. The professional learning of beginning teachers is influenced by the opportunities schools provide to stimulate professionalization. This insight implies that schools are directed toward becoming professional learning communities (PLCs). The PLC concept emerged from the school improvement literature and gained considerable interest during the last three decades. Simultaneously, many conceptual and methodological difficulties to define PLCs turn up because no universal definition exists up to now (Lomos, Hofman, & Bosker, 2011; Stoll, Bolam, McMahon, Wallace, & Thomas, 2006). The definition and measurement of the PLC concept has had a long development process. Its conceptualization started around the 1980s and in the first phase the concept was measured by using one subdimension. After the 1990s, the multidimensional perspective became dominant. In 2006 Stoll and colleagues stated in their review on PLCs that there appeared to be broad international consensus putting forward that a PLC can be defined as a school organization

in which a group of professionals share and question their practice from a critical point of view. This questioning happens in an ongoing, reflective, collaborative, and inclusive way which takes professional growth and orientation on learning into account. In her comprehensive review obtained from more than 60 articles on the measurement development of the PLC concept Lomos (2012) identified the Teacher's Professional Community index of Wahlstrom and Louis as the instrument that best met her analysis criteria. These criteria were related to the strength of the theoretical and empirical base, the reliability and validity of the subscales, and the recent character and the multidimensional perspective of the instrument. The instrument of Wahlstrom and Louis (2008) includes four characteristics: 'deprivatized practice', 'reflective dialogue', 'collective responsibility', and 'shared values and vision'. Using the Teacher's Professional Community index for a study on the relation between PLCs and student achievement in different educational tracks in secondary education, Lomos (2012) found that the subscales were differently related to student achievement. Reflective dialogue was most strongly related to student achievement, while in one specific case collective responsibility was even negatively related to student achievement. However, Lomos concluded that due to the small sample size, these results were preliminary and more research is needed to study the meaning of the different subdimensions.

The four characteristics of the Teacher's Professional Community index of Wahlstrom and Louis (2008) correspond to what Bryk, Camburn, and Louis (1999) described as a behavioral and a mental dimension of the PLC. First, the behavioral dimension consists of collaborative activities occurring between teachers. Studies frequently indicate that strong PLCs are built on teachers who often engage in discussions with colleagues about their teaching, learning, and instructional practice. Furthermore, teachers get the opportunities in strong PLCs to visit each other's classroom to observe teaching practices. These activities are represented in the two characteristics 'reflective dialogue' and 'deprivatized practice'. The mental dimension undergirds the collaborative activities of PLCs. Usually studies integrate features such as shared sense or

institutional purposes to embody this dimension (e.g. Stoll et al., 2006; Louis & Kruse, 1995). The characteristics of 'collective responsibility' and 'shared values and vision' correspond to this dimension.

For this study we used the four PLC characteristics that are defined in the Teacher's Professional Community index of Wahlstrom and Louis (2008). In view of the consensus of the last decade on the multidimensional character of PLCs and the possibility that the several characteristics can have a differential influence, we opted for the use of the four PLC characteristics and not for one variable that represents the entire PLC concept.

Reflective dialogue

Self-awareness of teachers on their personal work is a condition to generate reflective dialogue. Only then teachers can have in-depth conversations with other members of the school team about educational issues such as instruction and student development (Wahlstrom & Louis, 2008). These in-depth conversations with colleagues lead to new ideas. Driven by their individual teaching and learning process teachers will reflect on their own practice and think through how to implement the new ideas in their pre-existing knowledge. This results in a deeper understanding of the didactics and can initiate changes in educational practices and beliefs (Newmann, Marks, Louis, Kruse, & Gamoran, 1996; Newmann & Wehlage, 1995; Stoll et al., 2006).

Deprivatized practice

Another main aspect in a PLC is 'deprivatized practice'. This characteristic entails that teachers demonstrate collaborative efforts (Vescio et al., 2008). They use strategies such as reciprocal peer coaching, mutual observation, joint planning, and trade off roles of mentor, advisor, or specialist. Teachers define and develop their practice openly, foster sharing, and provide each other feedback (Kruse, Louis, & Bryk, 1995; Wahlstrom & Louis, 2008).

Collective responsibility

Collective responsibility means that teachers in a PLC create a joint sense of responsibility that has an obligatory effect from the peer group on

teachers who isolate themselves and want to avoid sharing. Teachers discuss the different manners of instruction to stimulate students' intellectual growth (Louis, Marks, & Kruse, 1996; Stoll et al., 2006; Wahlstrom & Louis, 2008).

Shared values and vision

PLCs carry out shared values on student learning. A shared vision will only manifest if there is a collective power to amplify common aims. This connectivity between teachers provides a context in which shared, collective, and ethical decision making becomes possible. The framework of decision making is embodied through language and actions in the classroom (Louis et al., 1996; Silins, Zarins, & Mulford, 2002; Stoll et al., 2006).

The relation between PLC characteristics and changes in DI practice

The current professional learning literature appoints PLCs as the most favorable context for professional learning, but only recently empirical studies focused on the changes in teachers' practices in PLCs (Parise & Spillane, 2010; Vescio et al., 2008). In their study, Bolam et al. (2005) indicated that teachers experienced a direct connection between their own professional learning opportunities within a PLC and changes in their practice. More specifically, when the school is featured by beliefs toward collective responsibility and shared norms for student learning, changes in practice occur more frequently (Scribner, Hager, & Warne, 2002). Furthermore, changes in behavior take place when teachers discuss classroom practices and reflect about it (Andrews & Lewis, 2007). We can conclude that research emphasized the stimulating and supportive role of PLCs on teachers' learning. However, few studies investigated the relationship between the PLC characteristics and changes in the classroom related to DI. Scholars have argued that beginning teachers feel the need to consult other teachers with regard to DI (Humphrey et al., 2006; Smit & Humpert, 2012). Moreover, Dunne, Nave, and Lewis (2000) declared that teachers who participated in collaborative settings used more student-centered practices over time. Teachers increased the use of techniques such as flexible classroom grouping and adapted the pace of instruction to meet the

different levels of student content mastery. In addition, Wahlstrom and Louis (2008) found that collective responsibility, shared norms, reflective dialogue, and deprivatized practice are important in determining the use of flexible grouping practices but that deprivatized practice is the strongest and most crucial predictor of flexible grouping practices. As few studies examined the differential influence of the PLC characteristics on teachers' professionalization in DI this study is exploratory in nature and we cannot make statements about which characteristic has a stronger influence on teachers' professional learning in DI. Consequently, we formulate one hypothesis which predicts that: *'PLC characteristics will be positively related to teachers' changes in DI practice'* (hypothesis 2).

Teacher self-efficacy

In this study, we identify teacher self-efficacy as a psychological state. Previous studies have shown that the psychological state 'self-efficacy', which represents the personal goals and/or beliefs about one's capacities, is essential for teachers' professional learning (Allinder, 1994; Geijsel, Sleegers, Leithwood, & Jantzi, 2003; Geijsel et al., 2009). Self-efficacy is grounded in the social cognitive theory that represents a causal model of dynamic and reciprocal interactions between personal factors in the form of cognitive, affective, and biological events, environmental factors, and behavior. In this way it tries to explain and predict how people acquire and maintain certain behavioral patterns (Bandura, 1977). Self-efficacy is identified as a set of beliefs that people create about their ability to achieve desired outcomes. Such efficacy beliefs determine how environmental opportunities are perceived, affect choice of activities, how much effort is spend on an activity, and how strong people persist when confronted with obstacles (Bandura, 1997). Interestingly, several studies have examined the relationship between teachers' self-efficacy and their behavior in the classroom such as teachers' adaptation of innovations, teachers' classroom management strategies, and teachers' classroom instruction (e. g. Fuchs, Fuchs & Bishop, 1992; Woolfolk, Rosoff & Hoy, 1990). More specifically, prior research documented positive effects of high teacher self-

efficacy on change in instructional practices related to DI. A study by Gibson and Dembo (1984) showed that teachers with a high level of instructional efficacy to educate difficult or unmotivated students spend more time on giving extra instruction to students who encounter difficulties than teachers with a low sense of instructional efficacy. Also, Wertheim and Leyser (2002) examined the efficacy beliefs of preservice Israeli teachers and their intentions to use instructional practices related to DI. Their findings suggest that teachers with higher personal teaching efficacy scores had more intentions to frequently use differentiated instructional practices. Similarly, Allinder (1994) and Guskey (1988) found that teachers with high self-efficacy beliefs have a positive attitude toward the use of new instructional methods in the classroom to better meet the needs of their students. Furthermore, teachers who have high levels of self-efficacy are more open to change their behavior in order to increase classroom effectiveness (Smylie, 1988). Taken together, previous research suggests that teachers who believe strongly in their ability to teach, create more divers learning opportunities for their students. In this regard, we predict that: *'The higher teachers' self-efficacy, the more they will report changes in their DI practice'* (hypothesis 3).

As mentioned earlier self-efficacy does not stand on its own. According to the social cognitive theory self-efficacy may function as mediator in the relationships between environmental contexts such as school contexts and (behavioral) outcomes (Bandura, 1997). Furthermore, evidence is found for the mediating function of self-efficacy within the JD-R model. Xanthopoulou et al. (2007) found that self-efficacy partially mediated the relationship between job resources and work engagement, indicating that job resources stimulate the development of self-efficacy.

Research pointed out that the effect of autonomy on teachers' learning can be explained partially by self-efficacy (Bandura, 1997). Autonomy has an enhancing effect on efficacy because it enables teachers to choose tasks that fit their skills and interests (Ryan & Deci, 2000). Self-efficacy, in turn, increases teachers' performance. Nonetheless, if teachers do not believe in their own

ability they are less likely to perform better. Recent studies in the educational field have shown that the relationship between teacher autonomy as a job resource and performance can be mediated by work engagement (Bakker & Bal, 2010). However, research that examines self-efficacy as a mediator for the relationship between job resources and professional learning is lacking. Based on these findings, we hypothesize that: *'Teachers' self-efficacy will partially mediate the relationship between teacher autonomy and teachers' changes in DI practice'* (hypothesis 4).

The PLC characteristics can also be mediated by teachers' self-efficacy. As previously mentioned, the social cognitive theory (Bandura, 1977) and the JD-R model (Xanthopoulou et al., 2007) emphasized that support from the school context is related to learning and performance through its relation with self-efficacy. Furthermore, a recent study by Lakshmanan, Heath, Perlmutter, and Elder (2011) uncovered that enhanced teacher efficacy is a meaningful benefit gained from participation in PLCs. Lakshmanan et al. (2011) stated that when the school environment offers chances to improve content knowledge and gives teachers opportunities to interact and engage in collaborative relationships growth in teacher efficacy can be established. Higher levels of teachers' efficacy may in turn have a positive effect on teachers' instructional practice. Moreover, previous research indicated that the relation between collaboration among teachers and professional learning is mediated by teacher efficacy (Geijsel et al., 2009). Soodak and Podell (1994) stated that teachers with a high sense of personal efficacy were more willing to take responsibility for meeting the needs of students with learning problems in their own classrooms. In their follow-up study Soodak, Podell, and Lehman (1998) found that teachers who perceived limited opportunities for collaboration and experience a low sense of self-efficacy were more hostile toward including students with disabilities in their classrooms. As stated above, stronger self-efficacy beliefs have been found among teachers who perceived a sense of community and collaboration in their school. There is evidence to suggest that collaborative activities may be particularly important for the self-efficacy of

novice teachers and teachers who move into a new setting. Novice teachers have fewer teaching successes toward meeting the needs of their students where they can rely on in comparison with experienced teachers. Therefore, younger teachers recognize a need to improve collaborative activities with regard to DI in order to increase their self-efficacy and subsequently enhance individual practice of DI (Burley, Hall, Villeme, & Brockmeier, 1991; Smit & Humpert, 2012). This leads us to the last hypothesis: *'The relationship between the PLC characteristics and changes in DI practice will be partially mediated by teachers' self-efficacy'* (hypothesis 5).

A summary of the variables that play a role in beginning teachers' professional learning, as we hypothesized, is presented in Figure 2.

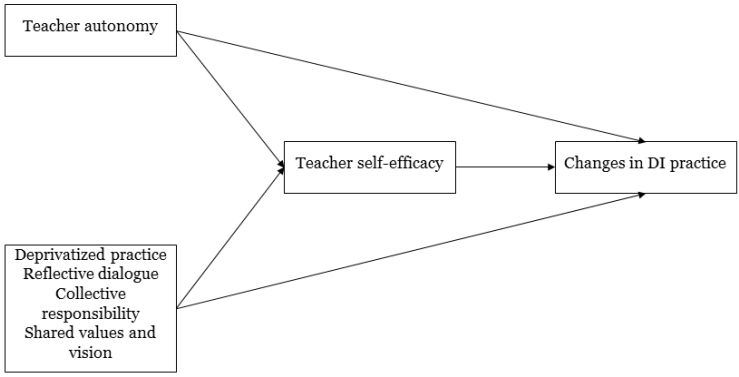

Figure 2. Theoretical model of the relations among job resources, teacher self-efficacy and changes in DI practice.

Method

Procedure and participants

Data were collected in 65 Flemish primary schools. To select the schools we used random sampling, taking the geographic region and the educational network into account. Schools are grouped in networks according to their governance structure and are all funded in the same way. In this sample,

there are 12 public schools, 18 subsidized municipal schools, and 35 subsidized private schools from which teachers were recruited. All teachers in these schools received a questionnaire where they had to score the items of the PLC characteristics because previous research found that a PLC and the PLC characteristics are represented and formed by all teachers of the teaching team and not only by the beginning teachers (e.g. Lomos, 2012). In total, 746 teachers filled out this questionnaire. This sample consists of 86.3% female and 13.7% male respondents. The average school experience of all participants is 12.36 years and the mean age is 38.60 years (SD = 9.33). The other scales included in this study were only completed by the beginning teachers of the schools. According to convenient criteria we considered teachers as beginning if they have been working for maximum five years in the participating school (Huberman, 1989). In addition, we set the required minimum teaching experience in the participating school to three months because we wanted to study the influence of PLC characteristics on teachers learning. We believe a minimum period of time is necessary for beginning teachers to experience school related influences. A total of 227 beginning teachers completed the questionnaire. This sample of beginning teachers included 90.3% female and 9.7% male respondents. This proportion reflects the proportion of beginning male and female primary school teachers in Flanders. The sample of beginning teachers had a mean age of 27.4 years (SD = 5.61) and an average school experience of 2.3 years.

Measures

The concepts in this study were operationalized and measured using existing scales and own developed scales.

Teacher self-efficacy

The teacher self-efficacy scale is based on the short version of the Ohio State teacher efficacy scale (Tschannen-Moran & Hoy, 2001) using a five-point Likert scale ranging from 1 (not at all) to 5 (very good). This scale consists of 9

items. An exemplary item is 'How much can you do to control disruptive behavior in the classroom?' (α = .78).

Teacher autonomy

To measure teacher autonomy, we used the Teacher Autonomy Scale of Pearson and Moomaw (2006) and selected 6 items of the subscale 'general teaching autonomy'. The score varies from 1 (strongly disagree) to 5 (strongly agree). Example item: 'The scheduling of use of time in my classroom is under my control' (α = .64).

PLC characteristics

We used the Teacher's Professional Community index (16 items) of Wahlstrom and Louis (2008) to measure the PLC characteristics (deprivatized practice, reflective dialogue, collective responsibility, and shared values and vision). 4 items measure deprivatized practice (e.g., 'How often in this school year have you visited other teachers' classrooms to observe instruction?'), 5 items measure reflective dialogue (e.g., 'How often in this school year have you had conversations with colleagues about the goals of this school?'), 3 items measure collective responsibility (e.g., 'Teachers in this school take responsibility for improving the school outside their own class.'), and 4 items measure shared values and vision (e.g. 'Most teachers in our school share a similar set of values, beliefs, and attitudes related to teaching and learning.'). All items are rated on a five-point Likert scale.

We conducted an exploratory (EFA) and confirmatory factor analysis (CFA) based on all 746 teachers who filled out the PLC scale. This sample was divided in two stratified random subsamples (subsample 1a = 381 teachers; subsample 1b = 365 teachers). The subsample 1a (n = 381) was used to carry out the first EFA with promax rotation. In this EFA all 16 items of the PLC scale were included. The results of this EFA suggested that only 3 factors should be retained. The factor loadings showed that two items measuring shared values and vision loaded on the collective responsibility factor. Furthermore the item (i.e. 'Teachers in this school feel responsible to help each other to improve their

instruction.') which originally belonged to the collective responsibility scale, also loaded on the shared values and vision factor. In the literature some researchers defined 'shared values and vision' as a supportive leadership condition instead of a PLC characteristic. These researchers stated that principals should try to develop a vision of learning shared and supported by the teaching team and based on consensus regarding common causes, interests, and goals (DuFour, DuFour, & Eaker, 2008; Fullan, 2006; Senge, 2006). Other researchers grouped shared values and vision together with collective responsibility and identified it as the characteristic normative control (Bryk, Camburn, & Louis, 1999). Given the inconsistent views in the literature on the position of shared values and vision and the results of the EFA we excluded the items that measure shared values and vision. Furthermore, another double loading was observed. The item (i.e. 'How often in this school year have you received meaningful feedback on your performance from colleagues?') which originally belonged to the deprivatized practice factor, also loaded on the reflective dialogue factor and was therefore deleted. We ran a second EFA (n = subsample 1a) with the remaining items (i.e. 3 items for deprivatized practice, 5 items for reflective dialogue, and 3 items for collective responsibility). The factor loadings of this final EFA can be found in Appendix A.

Furthermore, we conducted a CFA with the items of the final EFA by using the data from subsample 1b (n = 365). The CFA is performed using the R packages lavaan (Rosseel, 2012) and lavaan.survey (Oberski, 2014). The latter allows to perform structural equation modeling analyses on clustered data by taking into account the complex sampling design. In our sample teachers are nested within schools. Model parameter estimates are consistently aggregated over clusters while no explicit modeling of the effects of clusters is involved. As such, standard errors are corrected for the fact that observations are not independent. The degree of model fit was evaluated using multiple fit indices. In particular, we used the χ^2 test, the comparative fit index (CFI), the Tucker Lewis index (TLI), the standardized root mean residual (SRMR), and the root mean squared error of approximation (RMSEA). A well-fitting model has a

non-significant test statistic on the χ^2 test ($p > .05$). Furthermore, the CFI and TLI values greater than .90 are typically considered acceptable and values greater than .95 are indicative of good fit. Lastly, the fit of the model is considered acceptable when SRMR ≤ .08 and RMSEA ≤ .06 (Hu & Bentler, 1999). The CFA confirmed the three-factor structure. We found an acceptable fit between the adjusted model and the observed data ($\chi^2(40) = 107.727, p < .001$,): CFI = .94, RMSEA = .07, TLI = .92, SRMR = .06. The residuals were allowed to be correlated for one pair of items from the reflective dialogue scale, because of similar wording (Harrington, 2009) and a conceptual similarity (Dumay, 2009). All subscales had acceptable reliability coefficients: α = .74 (deprivatized practice), α = .76 (reflective dialogue), and α = .68 (collective responsibility).

Gender and age

In addition to the job resources (autonomy and the PLC characteristics) and teacher self-efficacy, gender and age were included as control variables.

Changes in DI practice

To our knowledge no scale exists to measure changes in DI practice. Therefore, we developed our own scale for this concept based on the findings of Bakkenes et al. (2010). The scale items are rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). An example item of this scale is 'Since I work at this school I better match the pace of learning of my students to their specific learning needs.'. The EFA revealed a one-factor structure. The scale demonstrated good reliability: α = .80. More detailed information about the items of the developed scale can be found in the Appendix B. Furthermore, the CFA yielded an acceptable fit: $\chi^2=16.022$, df=8, p=.042, CFI=.98, TLI=.96, RMSEA=.07, and SRMR=.04. Hence, the one-factor structure of the EFA is confirmed.

Data-Analysis

First, we report the descriptive statistics and correlations for all the study variables. Based on these results and our theoretical framework, we analyze the data via path analysis. We are aware of the fact that we cannot ignore the nested structure of our sample (teachers are nested within schools). However, as our variables were all assessed at the individual level and the number of individuals per group is small (average of beginning teachers per school is 3) we decide not to apply multilevel analysis (Hox, 2010; Muthén & Muthén, 1998-2012). However, we performed a path analysis using again the R packages lavaan and lavaan.survey which takes the clustered structure of our data into account and evaluated the degree of model fit using the fit indices CFI, TLI, SRMR, RMSEA, and the χ^2 test. In total, 16 beginning teachers did not fill out one or more scales of the questionnaire. These missing data may be due to drop out of teachers in the middle of the questionnaire. Moreover, it could be that teachers forgot to fill out a specific item of a particular scale. An ANOVA-analysis showed there was no significant difference between the group of beginning teachers who filled out the complete questionnaire and the group of beginning teachers who did not fill out on the variable outcome 'changes in DI practice'. As such, we expect the missingness to be non-systematic. Cases with missing values for at least one variable involved in the data-analysis were excluded from the analysis.

Results

Descriptive statistics and correlations

Descriptive statistics showed that the mean value of 'changes in DI practice' is relatively high (M = 3.77), indicating that beginning teachers report notable changes in their teaching practice since they work at their school. Furthermore, the mean scores of teacher autonomy (M = 3.80) and self-efficacy (M = 3.95) are high. Lastly, beginning teachers feel collectively responsible for student learning (M = 3.75) and frequently discuss educational issues with colleagues (M = 3.25). Remarkably 'deprivatized practice' has a low mean score

(M = 2.06), showing that teachers visit each other's classroom rarely. The correlation matrix revealed that changes in DI practice positively correlated with teacher self-efficacy and with the job resources (teacher autonomy, collective responsibility, deprivatized practice, and reflective dialogue). A negative correlation was found between changes in DI practice and age. Therefore, age was added to the research model as a control variable. However, there is no correlation between changes in DI practice and gender. Due to the small sample size of this study we want to present a model that is as parsimonious as possible. Hence, based on the non-significant correlation between gender and changes in DI practice we made the decision not to include gender in our research model.

Table 1. *Means (M), Standard Deviations (SD), and correlations among job resources, teacher self-efficacy, changes in DI practice, and the control variables (n=218).*

		M	*SD*	1	2	3	4	5	6	7	8
1.	Changes in DI practice	3.77	0.56	–							
2.	Teacher self-efficacy	3.95	0.38	.404**	–						
3.	Teacher autonomy	3.80	0.50	.270**	.264**	–					
4.	Collective responsibility	3.75	0.64	.295**	.321**	.052	–				
5.	Deprivatized practice	2.06	0.76	.196**	.240**	.049	.237**	–			
6.	Reflective dialogue	3.25	0.63	.329**	.269**	-.116	.451**	.447**	–		
7.	Gender	–	–	.092	.014	.034	.034	-.159*	-.018	–	
8.	Age	27.39	5.58	-.155*	-.104	-.106	-.150*	-.135*	-.234**	–	–

Note. * $p < .05$; ** $p < .01$

Table 1 displays the means, standard deviations, and correlations among the job resources and teacher self-efficacy, changes in DI practice, and the control variables.

Path analysis

Before performing a path analysis, the intraclasscorrelation (ICC) of the variables teacher self-efficacy and changes in DI practice are calculated. The ICC of self-efficacy is .138 which indicates that 13.8% of the overall variance in self-efficacy can be situated at the school level (between school differences), whereas 86.2% is attributable to individual differences between teachers. The ICC of changes in DI practice is .122, showing that 12.2% of the variation in changes in DI practice can be situated at school level, while 87.8% is attributable to differences between teachers. Both ICCs indicate that differences between teachers within schools largely exceed differences between schools.

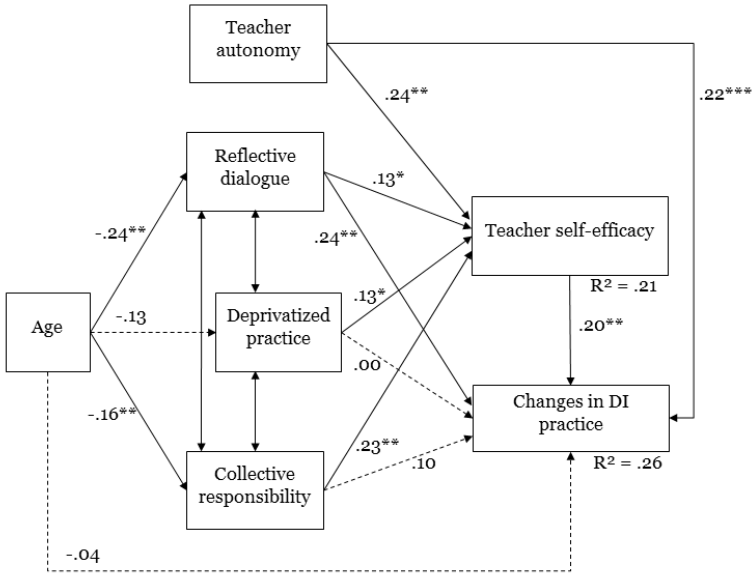

Figure 3. Path model (n= 208) explaining changes in DI practice in terms of job resources and teacher self-efficacy (* p<.05; ** p<.01; *** p<.001).

The path analysis we conducted was performed to test the fit of our research model we have put forward. The path analysis yielded an acceptable fit on all fit indices: $\chi^2 = 8.618$, df = 4, p = .07, CFI = .98, TLI = .89, RMSEA = .07, and SRMR = .03. We report the regression weights, significance level, and explained variance of the model in Figure 3.

To facilitate interpretation, direct, indirect, and total effects of the model in Figure 3 are presented in Table 2. The mediation analysis is conducted together with the path analysis in one model in lavaan.survey.

Table 2. *Direct, indirect, and total effects of job resources and teacher self-efficacy on changes in DI practice (n=211).*

	Changes in DI practice		
	Direct	Indirect	Total
Teacher self-efficacy	.20**		.20**
Job resources:			
Teacher autonomy	.22***	.05*	.27***
Collective responsibility	.10	.05*	.15*
Reflective dialogue	.24**	.03	.27***
Deprivatized practice	.00	.03	.03

Note. * $p < .05$; ** $p < .01$;*** $p < .001$

Results of the model show that job resources and teacher self-efficacy influence beginning teachers' changes in DI practice. Furthermore, the PLC characteristics have a differential influence in this model. A closer look at the results in Figure 3 shows that changes in DI practice are directly influenced by teacher self-efficacy (hypothesis 3) and teacher autonomy (hypothesis 1). Reflective dialogue has a direct influence on the changes beginning teachers report in the application of DI in the teaching practice, although collective responsibility and deprivatized practice does not directly influence changes in DI practice (hypothesis 2). In line with our expectations, the direct and indirect effects (Table 2) provide evidence that teacher self-efficacy partially mediate the relationship between teacher autonomy (hypothesis 4) and changes in

practice related to DI. Additionally, the relationship between collective responsibility (hypothesis 5) and changes in practices related to DI is fully mediated by teacher self-efficacy. Furthermore, the pathways between reflective dialogue and teacher self-efficacy and deprivatized practice and teacher self-efficacy are significant. However, teacher self-efficacy does not have a mediating role for reflective dialogue and deprivatized practice on the one hand and changes in DI practice on the other hand. Lastly, the control variable age has a negative significant relation with collective responsibility and reflective dialogue. Although, age is not related with deprivatized practice and changes in DI practice. The explained variance of beginning teachers' self-efficacy is 21%. In addition, the total amount of explained variance in the changes in DI practice is 26%.

Discussion

The present study examined the role of teachers' job resources and the psychological state 'teacher self-efficacy' in beginning teachers' learning in DI, which was conceptualized as 'changes in DI practice'.

The first main finding of this study is that teachers' job resources play a role in the learning process of beginning teachers in DI. Our findings revealed a direct relationship of teacher autonomy with changes in DI practice. In line with Pearson and Moomaw (2005), our results indicated that autonomous teachers have a higher degree of professionalism and indicate they use more differentiated instructional strategies than their colleagues who were less autonomous. Moreover, certain PLC characteristics are associated with beginning teachers' learning in DI. Similar to the study of Andrews and Lewis (2007) our results supported the predictive role of reflective dialogue on changes in practice. This finding is also in line with Tomlinson et al. (2003) who suggested that sharing high-level knowledge about effective differentiated educational approaches between teachers is indispensable to stimulate the use of DI in the classroom. Against our expectations, deprivatized practice was not significantly related to teachers' professional learning in DI which is in contrast with Wahlstrom and Louis (2008) who found that deprivatized practice is the

most critical PLC characteristic in determining the use of flexible grouping practices. Note, however, that Wahlstrom and Louis (2008) examined one specific form of DI, namely flexible grouping practice, while our study investigated different DI forms, such as differentiated assessment forms and instructional strategies. It could be that deprivatized practice has a differential influence on different DI strategies. Further research needs to clarify the role of deprivatized practice in the implementation of various differentiated instructional methods.

Contrary to our hypothesis, collective responsibility did not have a direct significant relationship with changes in DI practice. However, the relationship between collective responsibility and changes in DI practice is mediated through teacher self-efficacy. The study of Geijsel et al. (2009) also found that certain school factors directly influence teachers' professional learning whereas other school factors only indirectly affect teachers' learning.

A second main finding is that the psychological state 'teacher self-efficacy' is essential for beginning teachers' professionalization in DI. Similarly with previous research (Allinder, 1994; Tschannen-Moran & Woolfolk Hoy, 2007; Wertheim & Leyser, 2002), we observed that teacher self-efficacy is a predictor of the way beginning teachers report changes in DI practice. Beginning teachers who believe in their ability to address the learning needs of students show that they adapt their instructional methods more easily to meet the students' needs and persist in finding the right form of differentiation even when a differentiated instructional strategy fails for a specific student. This finding is also in line with the study of Holzberger, Philipp, and Kunter (2013) who found that self-efficacy and instructional quality are significantly correlated.

Furthermore, our study is consistent with research providing evidence for a mediating role of teacher self-efficacy in explaining teachers' professional learning as indicated by the JD-R model (Xanthopoulou et al., 2007). Our results found that teacher autonomy affects the changes of beginning teachers in DI through its relation with teacher self-efficacy. This means that more

autonomous teachers express higher levels of self-efficacy. In turn, self-efficacious teachers reported more that they implement differentiated instructional methods. This finding confirms the statement of Xanthopoulou et al. (2007) that self-efficacy partially mediates the relationship between autonomy and performance. Moreover, our study demonstrated that collective responsibility indirectly influence teachers' changes in DI practice through its relationship with teacher self-efficacy. As such, the more beginning teachers indicated that there is a collective responsibility toward student learning, the more they report high self-efficacy beliefs. In turn, the higher the self-efficacy beliefs of beginning teachers, the more they report changes in the implementation of DI in their classrooms. This observation is consistent with prior findings. First, with Tomlinson et al. (2003) who stated that teacher transformation toward more differentiated instruction calls for a common orientation among teachers to develop schools that understand, respect, and respond to individuals. Second, this finding is in line with the JD-R model of Bakker and Demerouti (2007) which indicated that support from colleagues can buffer high job demands. Remarkably, reflective dialogue has no indirect relationship with changes in DI practice through its relationship with self-efficacy. This finding is in contrast with the results reported by Lakshmanan et al. (2011) indicating that increased self-efficacy is an important benefit gained from discussing instructional issues with others and that higher levels of teachers' efficacy may in turn positively affect instructional changes in practice. As previously stated, our study explores the differential influence of the PLC characteristics on teachers' professionalization in DI. Hence, more research is required to profoundly get insight in this process.

Lastly, the control variable age is negatively related with collective responsibility and reflective dialogue. Previous research found that PLCs are more beneficial for new teachers than for teachers with more experience (Jones, Gardner, Robertson, & Robert, 2013). As age could be interpreted in terms of teachers' experience in a school the finding by Jones et al. (2013) could explain why more experienced teachers are less actively engaged in reflective dialogue

and perceive less collective responsibility. However, the range in age is limited in this study because we focused on beginning teachers' professional learning. Hence, future research with beginning, experienced, and expert teachers is needed to understand the relationship between age and the PLC characteristics.

Limitations and suggestions for future research

Some limitations of this study should be addressed. First, the explained variance in changes in DI practice is rather small. This is an indication of the complex nature of beginning teachers' learning in DI and shows that many variables might play a role in influencing this process. In this regard, more research is needed to enhance our understanding of the influential variables to stimulate beginning teachers' professional learning in DI. Moreover, it is possible that our data contain a ceiling effect due to an amount of teachers who strongly disagreed that they have changed their instructional strategies to better meet the specific learning needs of their students. Hence, we advise that researchers adjust the response categories to verify if the explained variance increases.

A second limitation of this study is that we used one single source, namely self-report measures. Hence, we did not measure the actual teacher behavior and the findings of our study must be treated with caution. Self-reports are sensitive to response tendencies. Teachers might provide for instance social desirable answers for the items of the changes in DI practice scale. Likewise, teacher autonomy and the PLC characteristics are measured by self-report of teachers. In research it is not unusual to measure school variables through self-reports but self-reports give a subjective experience of teachers about the school context rather then it provides an objective measure. Furthermore, self-reports are inherently biased by the feelings of the participant at the time they filled out the questionnaire. Persons who feel bad at the time they completed the questionnaire will have the tendency to answer the questions more negatively. However, it is still useful to get insight in the perceptions of beginning teachers on changes in practice. Previous research has indicated that self-report measures are valid to measure learning outcomes.

Nonetheless, researchers advise to use other complementary measures as well (e.g. Dumont, & Troelstrup, 1980). Therefore, we recommend that future research combines sources and investigates convergence between methods. A qualitative research design might be useful in which data can be collected through a combination of interviews, logbooks, or observations of actual changes of teachers' behavior. In a quantitative research design researchers can integrate objective measures of the school context or can include other actors that are involved in the learning process of beginning teachers such as principals or mentors.

Another limitation related to self-report is that the scale 'changes in DI practice' is measured at one point in time. To gain more understanding of the actual changes in practice scholars can develop surveys that contain two measurement moments to predict change in a variable from point one to two.

The fourth limitation concerns the PLC variable 'deprivatized practice'. In general, our results show that PLCs in Flanders are well developed, especially concerning the characteristic 'collective responsibility'. However, in our study the mean score of the studied variable 'deprivatized practice' is rather low. Hence, more specific attention to the variable 'deprivatized practice' is needed. The fact that teachers only occasionally observe teaching practices of their colleagues can have an influence on the relations in the model. Future research should explore the influence of deprivatized practice within schools were teachers observe each other's teaching practices more frequently.

In addition, this study selected specific PLC characteristics and included these characteristics as separated variables in the research model to examine the differential influence of the PLC characteristics on teachers' professional learning. As our study is exploratory in nature more research is needed to confirm the differential PLC relationships found in this study. Future research is also required to investigate the extent to which these PLC characteristics could merge in one PLC construct and how this construct as one variable affects teachers' learning.

Next, the JD-R model appointed performance feedback as another important job resource besides work autonomy and support from colleagues (Bakker & Demerouti, 2007). This study did not examined if the job resource 'performance feedback' is essential for beginning teachers' professional learning in DI. Further research should investigate which role performance feedback plays next to autonomy and support from colleagues in the professionalization of beginning teachers in DI.

A final limitation is the cross-sectional design of our study. This precludes any conclusions regarding causality. The Holzberger et al. (2013) study for instance analyzed the reciprocal relationship between self-efficacy and instructional quality in a longitudinal design. Instructional quality was rated by both teachers and students. An important finding in this study was that only teacher self-efficacy had a partial effect on instructional quality rated by the teachers and not by the students. Therefore, the authors suggested that cognitive processing of what teachers actually do is important to relate to efficacy beliefs, possibly more than the actual teaching behavior. As mentioned above, we cannot indicate causal effects between teacher self-efficacy and changes in DI practice in our study because of its cross-sectional design. However, we also measured changes in practice with teacher ratings and found a significant relationship between efficacy beliefs and changes in DI practice. Hence, our results also point in the direction of the importance of the perception of teachers' self-efficacy and of their perceived changes in practice. Our study is relevant in that it confirms the importance of teachers' cognitive processing of their actual behavior. Nonetheless, more research is necessary to confirm our findings within a longitudinal design.

Practical implications

Despite the limitations, our observations have several practical implications for schools and policymakers.

The results suggest that in order to improve the professional learning of beginning teachers related to DI, schools have to strive to optimize support from colleagues. That is, by stimulating beginning teachers to engage in in-

depth conversations with colleagues and by improving opportunities to share knowledge and experiences with other teachers on differentiated educational approaches. Furthermore, schools could create the conditions that reinforce a joint sense of responsibility among teachers to meet the needs of individual students. To increase the effects of collegial support, schools could appoint mentors who coach beginning teachers in the learning process of implementing DI in the classroom. Similarly, Pettig (2000) stated that teachers who have a buddy with whom they can share learning opportunities to fit various student needs find it much easier to differentiate the lesson content and activity. Mentoring could encourage to some degree more open conversations and practice related to DI between experienced and beginning teachers. In doing so, beginning teachers who struggle with the implementation of DI in the classroom can ask information to their mentors how to deal with challenging needs of students. In addition, teacher autonomy plays a crucial role in beginning teachers' professional learning in DI. Previous research (e.g. Clement and Vandenberghe, 2000) emphasized that besides collaboration, teacher autonomy is also important for teachers' professional learning. Our results confirm that neither teacher autonomy nor collaboration can be ignored as important job resources for teachers' professional learning. As such, researchers and practitioners could keep paying attention to both concepts. In this regard, schools should be aware that they motivate beginning teachers by stimulating collaboration among their staff to gain insight in the application of DI in the classroom. Furthermore, experienced teachers may be asked to provide beginning teachers good examples of effective differentiated instructional strategies. At the same time schools could protect the autonomy of their novices. Hence, schools may give beginning teachers the opportunities to plan lessons with differentiated instructional methods on their own. Furthermore, schools have to provide novices space and time to test autonomously which differentiated teaching techniques and strategies they prefer to use to meet the needs of their students. The combination of collegial support and the trust that schools give to teachers to develop autonomously an

instructional DI approach can increase teachers' self-efficacy. This in turn can stimulate teachers' learning processes which enables them to improve their DI practice. Moreover, central policy has to protect teacher autonomy by providing schools the necessary autonomy to develop their vision on DI and to support their teachers to implement DI. Imposing a high demands environment, with extreme expectations and directives toward beginning teachers, can be counterproductive to the development of an effective DI strategy.

Conclusion

As a transformation in society and schools evolves, effective beginning teachers in contemporary classrooms will have to learn to develop classroom routines that attend to students variance in learning needs. Previous studies showed that the process of meeting the needs of diverse students coincide with many difficulties (e.g. Holloway, 2000). As such, beginning teachers experience a high demands work environment when they try to implement DI in the classroom. To address this issue it is important to create a buffer that determines stability, trust, and support instead of a high pressure school environment. Earlier literature started with providing guidance for teachers how to plan and organize DI lessons (e.g. Tomlinson, 2001). More recently, scholars focused on identifying the specific barriers that obstruct DI implementation and found that providing teachers with DI tips is not enough to overcome the barriers teachers face in their attempt to use DI in their classrooms. More specifically, they stated that support structures are needed to realize DI implementation (e.g. de Jager, 2011; Tobin & Tippett, 2014). However, few studies offer insights in which factors facilitate teachers' application of DI. This study provides empirical evidence for the role of both job resources (i.e., teacher autonomy, reflective dialogue, and collective responsibility) and the psychological state 'teacher self-efficacy' in facilitating beginning teachers' learning in DI. In this way our findings extend the understandings of teachers' professional learning in DI. In particular, our results imply that higher levels of self-efficacy can be promoted by a school environment that creates the conditions in which teachers may benefit from

collegial support and autonomous functioning. Under such conditions, beginning teachers may gain trust and self-confidence that stimulate them to learn, to take new initiatives how to implement DI, and to change their DI practice. Considering job resources and teacher self-efficacy to understand changes in DI practice is important because DI implementation is an ongoing process with no simple blueprint or guaranteed good practice, that is likely to be influenced by various factors, and requires teachers to learn and experiment how they can address the needs of their students in the classroom the best.

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Appendix A

Results of the Final Exploratory Factor Analysis of the PLC items (subsample 1a, n=381)

Item description	Factor Loadings		
	Deprivatized practice	Reflective Dialogue	Collective responsibility
How often in this school year have you invited someone in to help teach your class(es)?	.49		
How often in this school year have you had colleagues observe your classroom?	.96		
How often in this school year have you visited other teachers' classrooms to observe instruction?	.59		
How often in this school year have you exchanged suggestions for curriculum materials with colleagues?		.44	
How often in this school year have you had conversations with colleagues about the goals of this school?		.53	
How often in this school year have you had conversations with colleagues about development of new curriculum?		.36	
How often in this school year have you had conversations with colleagues about managing classroom behavior?		.59	
How often in this school year have you had conversations with colleagues about what helps students learn best?		.93	
Teachers in this school feel responsible to help each other improve their instruction.			.50

Appendix A (continued)

Item description	Factor Loadings		
	Deprivatized practice	Reflective Dialogue	Collective responsibility
Teachers in this school take responsibility for improving the school outside their own class.			.81
Teachers in this school help maintain discipline in the entire school, not just their classroom.			.61

Appendix B

Results of the Exploratory Factor Analysis of the changes in DI practice items (n=213)

Item description	Factor 1
Since I work at this school…	
… I use more different group configurations in my classroom to meet the specific learning needs of my students.	.68
… I better match my instructional strategies to the specific learning needs of my students.	.58
… I use more varied lesson material so that I can meet the specific learning needs of my students.	.61
… I use more different assessment forms to meet the differences between my students.	.63
… I better match the pace of learning of my students to their specific learning needs.	.71
… I better match the learning contents to the students' interests.	.62

Chapter 3

The relationship between teacher education, school factors, and beginning teachers' professional learning related to differentiated instruction[1]

Abstract

Little research has investigated factors that facilitate beginning teachers' participation in professional learning activities related to differentiated instruction (DI). This study examines environmental factors for DI learning activities in a sample of 272 beginning teachers from 72 primary schools (see Figure 1). Multilevel analyses show that teacher education, reflective dialogue, deprivatized practice, educational type, and diversity in student population are related to beginning teachers' use of DI learning activities (i.e. learning in interaction related to DI and changes in DI practice). As such, the findings revealed that beginning teachers' participation in such activities may depend on a multitude of factors. Several suggestions regarding these factors are made. First, teacher education can provide foundational knowledge of DI applications. Second, schools can enable teachers to have in-depth conversations with colleagues and provide opportunities to observe good teaching practices. Lastly, alternative schools and schools with diverse student populations can inspire other schools to enhance participation in DI learning activities.

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[1] Based on De Neve, D., & Devos, G. (2016). The role of environmental factors in beginning teachers' professional learning related to differentiated instruction. *School Effectiveness and School Improvement*, Advance online publication. doi:10.1080/09243453.2015.1122637

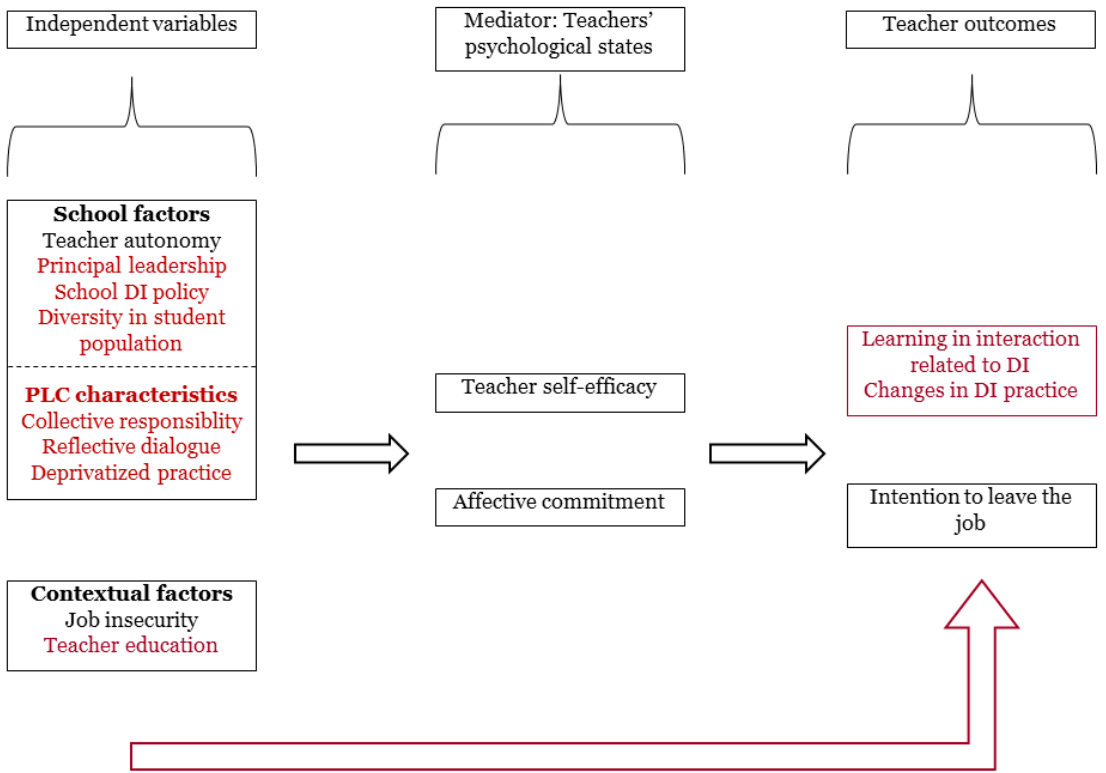

Figure 1. Chapter 3 situated in the guiding framework of this dissertation

Introduction

There is an increasing call from policy makers for schools to address the needs of academically diverse students, and this prompts teachers to implement differentiated instruction (DI) in the classroom (e.g. Humphrey et al., 2006). DI is a pedagogical approach that focuses on how teachers fit the level of task complexity, pacing, and learning activities to the needs, readiness, and interests of individual learners (Tomlinson et al., 2003). Humphrey et al. (2006) identified three main reasons for increasing the call to introduce DI. First, general mobility within and across countries increases the call for DI at the cultural level (European Commission Directorate General for Education and Culture, 2003). Second, concerns have been raised regarding students who drop out of school and who fail to achieve adequate levels of literacy (Gregory & Kuzmich, 2005). Finally, policy development leads to an increase in students with special educational needs in mainstream schools (Farrell & Ainscow, 2002).

Also in Flanders (Belgium), there are visible policy initiatives to encourage the inclusion of students with special educational needs in mainstream education. One of the Flemish government's priorities is that the education system evolves from a 'two-track' approach – where pupils with special educational needs are placed in special schools and are separated from pupils in mainstream schools – to a 'one track approach' that includes most of the pupils in mainstream education (Meijer, Soriano, & Watkins, 2003). To stimulate this process of change, since 2008 the Flemish government has been urging mainstream education by decree to give students with special educational needs reasonable adjustments. In 2014 the Flemish government intensified the request to implement DI in the classroom by approving the M-Decree that enables students with disabilities to attend classes in mainstream education. In response to these demands, teachers are required to develop new knowledge and teaching skills to give shape to the DI idea in practice.

It is clear that specific domains of teaching behavior such as differentiated teaching – which means that teachers include DI as a pedagogical

approach in their teaching practice – positively affect students' learning (Maulana, Helms-Lorenz, & van de Grift, 2015a) and students' perceived academic motivation (Maulana, Helms-Lorenz, & van de Grift, 2015b). However, encouraging teachers to implement DI in the classroom is a complex process (Pettig, 2000) that necessitates a stepwise approach. Studies on primary school teachers (van de Grift, van der Wal, & Torenbeek, 2011) and secondary student teachers (van de Grift, Helms-Lorenz, & Maulana, 2014) suggest that teachers need to master basic skills such as efficient classroom management in order to develop more complex teaching skills, such as adapting teaching to different students. According to Holloway (2000) and van de Grift et al. (2014), beginning teachers experience particular difficulties in implementing DI because they are overwhelmed with the full pedagogical and legal responsibility of their new job (Tynjälä & Heikkinen, 2011). Schools expect that beginning teachers simultaneously cope with their new work challenges, the needs of their students, and with the requests of the students' parents (Jokinen, Heikkinen, & Morberg, 2012). Beginning teachers express that adapting the lessons to the diversity of students in the classroom is one of the most challenging tasks they encounter (Ruys, Defruyt, Rots, & Aelterman, 2013; Smit & Humpert, 2012; Tomlinson et al., 2003). Indeed, previous research indicates that beginning teachers experience barriers, such as lack of curriculum support, supplementary resources, and time to conduct good DI lessons (Goodnough, 2010; Tobin & Tippett, 2014). Scholars state that beginning teachers need the appropriate support to overcome these barriers (Fantilli & McDougall, 2009; Mansfield, Beltman, & Price, 2014). However, there is still a paucity of literature on which factors can stimulate beginning teachers to professionalize in DI.

This study examines environmental factors that could enhance DI learning for beginning teachers. In this study, 'beginning teachers' refers to those teachers who have been working for a minimum of three months and a maximum of five years in the participating school (Huberman, 1989). Furthermore, 'environmental factors' are defined as influencing agents that are

external to the teacher. In general, two types of environmental factors can influence beginning teachers' learning in DI – namely teacher education and schools. Teacher education is a contextual factor that can shape beginning teachers' educational views and beliefs with regard to DI and provides them with guidance on how to implement DI in the classroom (Tomlinson, 1999a). A second type of factors are school factors such as principal leadership and collaboration among teachers, which have great potential for stimulating teachers' professional learning in DI (e.g. Hertberg-Davis & Brighton, 2006; Wahlstrom & Louis, 2008). Moreover, investigators have explored the impact of school policy on teacher learning and sustained improvement. Research has shown that schools with a specific pedagogy (e.g. Montessori) and schools with a policy document more easily motivate teachers to implement DI in their classrooms (e.g. Beecher & Sweeny, 2008; Hazel & Allen, 2013). In line with this research, for this study we consider educational type (traditional versus alternative schools, e.g. Montessori) and policy documents on DI as potential school factors related to school policy which may increase beginning teachers' professionalization in DI. Lastly, the relationship between school factors, such as diversity in student population, and teachers' own learning has also been the subject of research (Muijs, Harris, Chapman, Stoll, & Russ, 2004). We selected diversity in student population as the last school factor because previous studies (e.g. Jackson, 2005) assume that the influence of student populations can be of key importance in teachers' use of DI strategies.

Since this study is focused on how environmental factors are related to DI learning, we adopted the professional development perspective – which suggests that the workplace context is the most favorable place for acquiring new teaching skills – to understand the complexity of teachers' learning and to select the professional learning activities (Hargreaves, 1997; Scribner, 1999). Drawing from prior research evidencing the role of feedback-seeking (e.g. Van Eekelen, Boshuizen, & Vermunt, 2005) and personal teaching experiences (e.g. Bakkenes, Vermunt, & Wubbels, 2010) in the professionalization of teachers,

we include learning in interaction and changes in practice as professional learning activities related to DI.

Given that DI is increasingly gaining importance in contemporary education, this study aims to gain insight into the factors that facilitate beginning teachers' learning in DI. We investigate how teacher education, diversity in student population, educational type, policy documents, principal leadership styles, and forms of collaboration between colleagues are related to learning in interaction related to DI and changes in DI practice. By identifying crucial environmental factors that support beginning teachers in dealing with DI, the barriers related to DI implementation can be reduced and student achievement can be enhanced.

Theoretical framework

Professional learning activities related to DI

Teachers need to acquire new skills and competencies related to DI and take on new teaching roles to address the increasing calls from policy makers (McLaughlin, 1997). Implementation of DI requires teachers to focus on their role as facilitator in students' learning processes by creating diverse learning environments. The acquisition of these new skills and competencies related to DI involves an active, constructive, and long-term learning process in which teachers undertake professional learning activities to make improvement and change possible (Avalos, 2011; Meirink, Meijer, & Verloop, 2007). The professional development perspective on teacher learning provides an interesting approach to understand beginning teachers' learning in DI (Kwakman, 2003).

According to this perspective, teachers' professional learning needs to be situated within schools, on the one hand, and in classrooms, on the other (Putnam & Borko, 2000). In addition, this perspective assumes that teachers have to take charge of their own learning. Hence, it is important that teachers undertake professional learning activities to increase their own professionalization in DI. Furthermore, the professional development perspective notes that professional learning activities are not only individual

but also social in nature (Hargreaves, 1997; Jarvis, 1987; Little, 1993). Previous studies indicate that the feedback teachers ask for from colleague-teachers within the school supports their learning. Indeed, teachers can use the expertise of their colleagues to learn new teaching skills (Borko, Mayfield, Marion, Flexer, & Cumbo, 1997; Van Eekelen et al., 2005). Based on these findings and the abovementioned conception of learning, 'learning in interaction related to DI' is identified as the first professional learning activity in this study. Learning in interaction covers the actions teachers carry out to obtain knowledge and feedback from colleagues (Holman, Epitropaki, & Fernie, 2001; Meirink et al., 2007; Van Eekelen et al., 2005).

Teachers can also learn from their own experience. Research has shown that teachers' learning is stimulated by try-outs of which classroom instructions work best for their students (Bakkenes et al., 2010; Geijsel, Sleegers, Stoel, & Krüger, 2009). In their longitudinal study into how teachers learn, Bakkenes et al. (2010) distinguish six categories of learning activities from their data. One of the learning activities that teachers reported the most frequently in this study is 'experimenting'. Bakkenes et al. (2010) describe experimenting as a learning activity that represents a combination of intentionally trying out something new in practice and reflecting on it. Examples of changes in practice are trying out a new lesson format, using a new approach to interact with students, or finding a new way to prepare lessons. Therefore, 'changes in DI practice' is defined as the second professional learning activity, which refers to how flexibly teachers adapt their classroom behavior.

Various factors may stimulate the participation of teachers in professional learning activities (e.g. Geijsel et al., 2009; Kwakman, 2003). In the following paragraphs, we will review which environmental factors may enhance teachers' engagement in DI learning activities. However, most research focuses on professional learning in DI for groups of teachers with mixed experience in teaching, or for experienced teachers. Few studies have examined which environmental factors stimulate beginning teachers to engage in DI learning activities. In an attempt to fill this gap, this study seeks to

uncover the factors that are specifically related to beginning teachers' engagement in DI learning activities.

Teacher education

Teacher education represents the first opportunity for most teachers to develop teaching skills and familiarize themselves with DI. In Flanders, the Flemish government established general standards for students graduating from initial teacher training programs. These basic competencies, formalized in the profession profile, represent the knowledge, skills, and attitudes each graduate student needs in order to fully function as a beginning teacher in a school context. Based on the policy priority of the Flemish government that teachers have to deal with the diversity they experience in their classrooms, a new professional profile of teachers with a focus on DI was developed (Aelterman, Meysman, Troch, Vanlaer, & Verkens, 2008). Consequently, teacher training programs in Flanders put effort into developing preservice programs that provide a meaningful understanding of DI. According to Goodnough (2010), these types of preservice programs offer a variety of strategies to prepare students better for teaching a diverse class group. Beginning teachers who have attended such a program had a better understanding of the needs of learners and reported an increased awareness of adapting classroom practices (Tomlinson, 1999a). However, scholars state that graduated student teachers still lack experience and skills to sufficiently bring DI into practice (Holloway, 2000; Korthagen, Loughran, & Russell, 2006). Therefore, the learning process of graduate student teachers continues within schools and graduate students must be willing to seek opportunities that can boost their teaching skills regarding DI. Currently, scholars such as Bakkenes et al. (2010) are capturing how national innovations can change the knowledge and beliefs of teachers. However, few studies examine in what way preservice programs a) change the knowledge and beliefs of beginning teachers in relation to DI and b) make a difference in engaging beginning teachers in participation in DI learning activities.

Principal leadership styles

Principals play a pivotal role in stimulating school effectiveness and teachers' professional learning (Schleicher, 2012; Supovitz, Sirinides, & May, 2010). In particular, there is evidence that the support given by principals is a necessity in realizing the effective use of DI in the classroom (Hertberg-Davis & Brighton, 2006; McAdamis, 2001; Page, 2000).

Instructional leadership

Different principal leadership practices are essential to stimulate the use of DI. Principals (a) have to develop an understanding of the key definitions and principles of DI, (b) must have a rationale for why learning in diverse ways makes sense for the school, and (c) should have a DI implementation plan with a clear end goal in mind to persuade the teaching team that DI must be integrated within the academic curriculum (Beecher & Sweeny, 2008). Furthermore, Tomlinson (1999b) stated that principals must encourage teachers to apply DI with flexibility, creativity, and choice and help them to manage and plan DI in the classrooms. Based on these results we believe that in order to stimulate DI implementation, principals should have the characteristics of an instructional leader.

According to Hallinger (2005), instructional leadership consists of three underlying dimensions: (a) defining the school's mission, (b) managing the instructional program and curriculum, and (c) promoting a positive school climate. To realize the first dimension, instructional leaders need to communicate and model clear goals in relation to academic improvement. To achieve the second dimension leaders should be deeply engaged in stimulating, monitoring, and supervising teaching and learning in schools. Finally, promoting a positive school climate involves leaders adopting the necessary kinds of values and practices for supporting instructional improvement.

Transformational leadership

In addition to instructional leadership practices, DI studies identify principal leadership practices from a different perspective. Tomlinson (1999b)

states that principals must encourage teachers to collaborate with colleagues in order to plan and implement DI. Moreover, studies show that principals, who understand that DI is a long-term process and hold high but realistic expectations for their teachers in relation to DI, have a bigger impact on teachers' willingness and ability to differentiate instruction. Scholars also note that teachers need emotional support to feel comfortable with differentiating instruction. In schools where principals give attention to the wellbeing of their teachers, DI is implemented more easily (Hertberg-Davis & Brighton, 2006; Tomlinson, Brimijoin, & Narvaez, 2008). The abovementioned principals' leadership practices can be associated with transformational leadership. Consequently, transformational leadership is included in this study.

Leithwood, Jantzi, and Steinbach (1999) consider that transformational leadership consists of three major areas – namely (1) mission-centered, (2) performance-centered, and (3) culture-centered. In each area different components can be identified. The first area involves building a consensus of school vision, school goals, and priorities. The second includes retaining high performance expectations, accommodating individualized support, and supplying intellectual stimulation. To provide individual support transformational leaders take the position of coach or mentor to establish learning opportunities and help individuals to be responsible for their own learning process (Bass & Riggio, 2006; Marks & Printy, 2003). Intellectual stimulation is created by transformational leaders who use innovation and creativity to motivate teachers to question traditions and try out new approaches. As such, principals prompt teachers to undertake initiatives that stimulate their learning. Lastly, the culture-centered area is composed of symbolizing professional practices and organizational values and developing structures for participation in school decisions.

Recent studies show that a combination of instructional and transformational leadership seems to be essential for stimulating teaching and learning (Robinson, Lloyd, & Rowe, 2008). Indeed, scholars state that transformational and instructional leadership are interdependent and each

type of leadership is insufficient when it is used on its own (Marks & Printy, 2003; Printy, Marks, & Bowers, 2009).

In sum, we can conclude that instructional and transformational leadership are jointly vital in stimulating teachers' use of DI. However, the studies reported above (e.g. Beecher & Sweeny, 2008; Hertberg-Davis & Brighton, 2006) use a qualitative research design. Among quantitative studies little consistency is apparent in the findings. A study by Goddard, Neumerski, Goddard, Salloum, and Berebitsky (2010) shows that principals' instructional support, which is a leadership style that combines transformational and instructional leadership, positively predicts the degree to which teachers report that DI is the norm in their schools. In contrast, Smit and Humpert (2012) found no direct effect of the school leader on DI, but that school leadership indirectly influenced professional learning in DI via team culture. Lastly, Wahlstrom and Louis (2008) found that instructional leadership is positively related to the use of flexible grouping practices. However, this significant relationship disappears when forms of collaboration between teachers are added to the model. Hence, further research is needed to clarify which particular role principal leadership styles play in beginning teachers' professionalization in DI.

Characteristics of professional learning communities

Considerable research shows that schools play an important role in stimulating teachers' professional learning by providing them with opportunities to collaborate (Darling-Hammond, Chung Wei, Alethea, Richardson, & Orphanos, 2009; Vescio, Ross, & Adams, 2008). For example, collaborative meetings and teamwork can make the work of preparing DI lessons more rewarding because it allows teachers to provide feedback and share expertise (Orlich et al., 2013). Also, co-teaching or working together in one classroom enables teachers to give more attention to each student individually. Such opportunities to collaborate seem one of the most important strategies for implementing DI (Dunne, Nave, & Lewis, 2000; Fogarty & Pete, 2011; Pettig, 2000).

The professional development perspective indicates that teachers get the most collaborative learning opportunities when schools function as professional learning communities (PLCs; Kwakman, 2003). In the last three decades, scholars have given more attention to the PLC concept. Many attempts have been made at defining PLCs. However, the definition of PLC differs in empirical studies (Lomos, Hofman, & Bosker, 2011; Stoll, Bolam, McMahon, Wallace, & Thomas, 2006). Lomos et al. (2011) state that the PLC concept is explained from several theoretical perspectives. The first perspective focuses on the human element of communities arguing that the profit grows from building on the synergies of individuals in common locations or with similar interests that underlie shared understandings, skills, and knowledge for shared purposes or visions (Sullivan & Glanz, 2006). This perspective represents the broader concept of PLCs that is used by scholars to describe situations where teachers unite to promote change and share risks and responsibility through shared decision-making and collaborative empowerment (Gordon, 2004). A second perspective adopts a system-oriented view of schools and is focused on organizational structures of school workplace environments that can enhance professional learning and leads to transformational changes (Thompson, Gregg, & Niska, 2004). Organizational structures refer to the way a school is arranged and the relational ways in which professionals build a PLC (Fallon & Barnett, 2009). Besides the diversity in theoretical perspectives, researchers use multiple views of community to grasp the collaborative aspect within a PLC. Following Westheimer (1998), some views of communities try to strengthen conservative notions of individual rights and freedoms, while others question the relationship between power and authority.

Nonetheless, in their seminal review Stoll et al. (2006) state that there is a broad international consensus in defining a PLC as a school organization consisting of a school team that critically shares and questions its practice. This sharing occurs in an ongoing, reflective, collaborative, and inclusive way, focusing on professional improvement and orientated toward learning. Furthermore, several studies underscore the multidimensional character of the

PLC concept. This resulted in the introduction of many different PLC characteristics as key variables. In her extensive review, based on more than 60 articles on the measurement development of the PLC concept, Lomos (2012) identified the Teacher's Professional Community index of Wahlstrom and Louis (2008) as the best and most recent PLC scale with a strong theoretical and empirical base to measure teachers' perspectives on the PLC characteristics in schools. The Teacher's Professional Community index contains four characteristics: 'reflective dialogue', 'deprivatized practice', 'collective responsibility', and 'shared values and vision'. Lomos (2012) attempted to validate the Teacher's Professional Community index in the Dutch educational context and retained a three-factor structure including deprivatized practice, reflective dialogue, and collective responsibility. In previous research, on grounds of demonstrated exploratory (EFA) and confirmatory factor analysis (CFA), we also found the three characteristics Lomos retained in her validity study (De Neve, Devos, & Tuytens, 2015). Hence, we include in our study these PLC characteristics, which are explained more in-depth below. It is important to recognize that PLCs are affected by contingent national contextual differences and that a wide variation in PLCs exists between schools. However, the presence of the abovementioned PLC characteristics within a school provides a method for distinguishing a PLC from other forms of school cultures (Louis, Marks, & Kruse, 1996; Stoll et al., 2006).

Reflective dialogue

To generate reflective dialogue, it is essential that teachers are conscious of their personal work. When this condition is fulfilled, teachers can have in-depth conversations with colleagues about educational issues such as instruction and students' intellectual growth (Wahlstrom & Louis, 2008). New ideas can come from these in-depth conversations (Louis et al., 1996; Newmann, Marks, Louis, Kruse, & Gamoran, 1996; Newmann & Wehlage, 1995; Stoll et al., 2006). Guided by their personal learning process, teachers critically reflect on their own practice and search for options as how to integrate the new ideas into

their pre-existing knowledge. This results in a deepened understanding of the didactics and can initiate changes in educational practices (Verbiest, 2008).

Deprivatized practice

The use of strategies such as reciprocal peer coaching, mutual observation, and trading off the roles of mentor, advisor, or specialist are embedded in the characteristic deprivatized practice. Teachers define and develop their practice openly and make their teaching public. This makes it possible for the teachers to give feedback to one another (Kruse, Louis, & Bryk, 1995; Wahlstrom & Louis, 2008).

Collective responsibility

Teachers within a PLC attempt to create a joint sense of responsibility toward student learning. It is assumed that such a collective responsibility helps to sustain commitment and that the peer group has an obliging effect on teachers who isolate themselves and want to avoid sharing. To achieve collective responsibility, teachers discuss the different ways that instruction can stimulate students' academic improvement (Louis et al., 1996; Stoll et al., 2006; Wahlstrom & Louis, 2008).

Diversity in student population

For this study, we identify the student population as a school factor because there is evidence that populations of students can affect teachers' learning in DI (e.g. Beecher & Sweeny, 2008). Research demonstrates that minority students perform better and participate more actively in their classrooms when their school environment is sensitive to their culture. Furthermore, teaching methods are indicated as effective when they incorporate students' cultural backgrounds with regard to their understanding of content and learning interests (Foster, 1995; Gay, 2000; Jackson, 2005; Yen, 2009). Additionally, Beecher and Sweeny (2008) found that DI enhances student performance and reduces the achievement gap between students from high and low socioeconomic status (SES) families and among students of different ethnic groups within one school. In line with the studies mentioned

above, it seems plausible that teachers in schools with students of diverse backgrounds will be challenged more to provide highly elaborated DI forms. However, the association between diversity in student populations within schools and DI learning activities remains underexplored.

School policy

The opportunities which school policy can provide for teachers to learn are crucial for their practice and for student achievement. More specifically, the values, beliefs, mission statement, and policy plans can structure a coherent school policy which can direct and stimulate a more focused professional development of teachers (D. K. Cohen & Hill, 2000).

Educational type

It has been established that schools with clear pedagogical beliefs and values have better student outcomes (Goldring & Cravens, 2008). However, having a common pedagogy among teachers is rare (Hazel & Allen, 2013). In Flanders, schools can be categorized according to educational type (i.e. traditional or alternative schools). Alternative schools are known for their strong focus on a specific pedagogy. They are guided by the educational ideas and teaching philosophy of specific theorists (e.g. Montessori) or focus on experienced-based education. Hazel and Allen (2013) found that teachers in alternative schools could clearly articulate the schools' educational philosophy and why it was good for learning. They are also strongly committed to implementing this philosophy. Moreover, alternative schools strongly promote the implementation of innovative classroom practices such as DI (Eurydice, 2013; Flemish Department of Education and Training, 2014). Hazel and Allen (2013) show that one of the essential building blocks in the pedagogy of alternative schools is 'individualization', which describes teachers' practices that acknowledge and accommodate diverse learning trajectories for students. Additionally, Rathunde and Csikszentmihalyi (2005) found that Montessori students spent more time on collaborative work and individual projects than traditional students. Similarly, a study by Verhaeghe and Gadeyne (2004)

shows that kindergarten teachers in Freinet schools use more learning centers and have a more positive attitude toward including children with disabilities into the classroom than kindergarten teachers in traditional schools. The findings of these studies suggest that alternative schools are more open toward promoting and using DI applications. However, research is lacking on how alternative schools engage beginning teachers in active participation in DI learning activities.

Policy documents toward DI

In their study Beecher and Sweeny (2008) state that effective school improvement requires a comprehensive plan of action. Specifically, it has been argued that developing a policy document or instructional plan expressing the DI vision serves as an important step in DI implementation (Lawrence-Brown, 2004). It is crucial that these documents are developed in dialogue with the teaching staff, contain a theoretical and practical definition of DI, and that they include clear expectations and examples of how DI has to be realized in practice (Beecher & Sweeny, 2008; Holloway, 2000; Mills et al., 2014). Previous studies found that when a school lacks a common definition of DI, there is a misconception about DI among teachers or there are different understandings of it. This diversity in DI interpretation results in uncertainty about what is expected of teachers in relation to DI and how to put it into practice. Furthermore, teachers may believe that making occasional minor modifications in lessons is adequate to address students' academic diversity (Mills et al., 2014; Tomlinson, 1995). Undeniably, developing vision documents is essential for achieving DI implementation. However, to the best of our knowledge, no research has explored in which way DI vision documents are related to beginning teachers' engagement in professional learning activities related to DI.

Purpose of study

This study wants to examine the importance of various environmental factors in beginning teachers' participation in DI learning activities. In order to do this, on the one hand we focus on teacher education, principal leadership

styles (instructional and transformational leadership), and characteristics of PLCs (reflective dialogue, deprivatized practice, and collective responsibility) and, on the other hand, on diversity in student population, educational type, and DI vision documents. Since teachers' professional learning activities are vital for their professionalization in DI, we put forward 'learning in interaction related to DI' and 'changes in DI practice' as dependent variables in this study.

Methods

Sample

Our research took place in 72 Flemish primary schools (Belgium). The sample was stratified for region and educational network (13 public schools, 18 subsidized municipal schools, and 41 subsidized private schools). Also, we stratified schools for educational type and pupil diversity. Both 'traditional' and 'alternative' schools are integrated (i.e. educational type) in this sample. In Flanders, alternative schools represent a relatively small proportion of schools in the population (80 of 2500 schools). Since these schools enhance the diversity of pedagogical visions within the Flemish educational context and are pioneers in the implementation of innovative classroom practices such as DI, we oversampled alternative schools. In total, 15 alternative and 57 traditional schools participated. To measure educational type we developed a categorical variable (alternative schools 1; traditional schools 0). Furthermore, we stratified for diversity in student population according to the additional teaching hours the Flemish government provides as funds to primary schools. The percentage of students from a low SES background in each school is the allocation factor for these funds between schools. Schools get these additional teaching hours to create equal opportunity for all students through developed educational practices. We calculated the ratio of the amount of additional teaching hours to the amount of normal teaching hours for each school in the population. The assigned ratios per school were ranked and divided into two equal groups (low and high). A sample of 33 schools with a high percentage of students from a low SES background (low SES schools) and 39 schools with a high percentage of students from a high SES background (high SES schools)

took part in this study. Diversity in student population was included as a second categorical variable (low SES schools 1; high SES schools 0).

In each school, we retrieved policy documents that describe the school's view on DI and beginning teachers received a questionnaire. As mentioned previously, we identified teachers as beginning if they had been working for a maximum of five years in the participating school (Huberman, 1989). Additionally, we believe a minimum set of three months of teaching experience in the participating school is necessary because we want to study the influence of school-related variables (PLC characteristics and principal leadership styles). We assume a minimum period of time is required for beginning teachers to experience influences related to the school. In total 272 beginning teachers filled out our questionnaire. This sample included 89.7% female and 10.3% male respondents, mirroring the disproportionate percentage of women to men in primary schoolteacher positions. The beginning teachers' average age is 27.10 years (SD = 5.05) and the average school experience is 2.33 years (SD = 1.37).

Measures

Teacher survey

The concepts in this study were operationalized and measured using existing scales and our own developed scales.

Instructional leadership

To measure instructional leadership, we selected five items from the instructional leadership scale of Louis, Dretzke, and Wahlstrom (2010). An example item is 'My school leader clearly defines standards for instructional practices.' (α = .89).

Transformational leadership

We used the scale of Hulpia, Devos, and Rosseel (2009) to measure transformational leadership (10 items). This scale consists of items such as 'My principal compliments teachers.' (α = .93). The items of both leadership scales were rated on a five-point Likert scale (1 - never; 5 - always).

PLC characteristics

Based on the EFA and CFA in previous research (De Neve et al., 2015) we used 11 items of the Teacher's Professional Community index of Wahlstrom and Louis (2008) to measure the PLC characteristics (reflective dialogue, deprivatized practice, and collective responsibility). Five items measure reflective dialogue (e.g. 'How often in this school year have you had conversations with colleagues about the goals of this school?'), three items measure deprivatized practice (e.g. 'How often in this school year have you visited other teachers' classrooms to observe instruction?'), three items measure collective responsibility (e.g. 'Teachers in this school take responsibility for improving the school outside their own class.') The scores of the items for reflective dialogue and deprivatized practice vary from 1 (never) to 5 (very often). Furthermore, teachers rated the items for collective responsibility from 1 (strongly disagree) to 5 (strongly agree). All subscales showed a satisfactory internal consistency: $\alpha = .69$ (collective responsibility), $\alpha = .70$ (deprivatized practice), and $\alpha = .68$ (reflective dialogue).

To our knowledge, no scales exist to measure in which way teacher education changes the mind-set of beginning teachers in relation to DI and to measure professional learning activities related to DI (i.e. learning in interaction and changes in practice). Hence, we developed scales ourselves to measure these variables.

Teacher education related to DI

We developed a scale of 3 items to measure how strongly the teacher training program changes the mind-set of beginning teachers in a positive way. The items are based on Bakkenes' category 'changes in knowledge and beliefs' (Bakkenes et al., 2010) and were adjusted to measure changes in knowledge and beliefs in relation to DI. As such, this scale wants to capture if teacher training programs increased the DI related knowledge of beginning teachers and strengthens beginning teachers' beliefs that they can apply DI in the classroom. The items are rated on a five-point Likert scale (1 - strongly disagree, 5 - strongly agree). An example item of this scale is 'Due to my teacher education

program I find it practicable to apply DI in my lesson'. The EFA revealed a one-factor structure. This factor explained 73.1% of the variance. The scale demonstrated good reliability: α = .88. More detailed information about the items of the scale can be found in Appendix A.

Professional learning activities related to DI

We distinguished 'learning in interaction' and 'changes in practice' as the DI professional learning activities. For learning in interaction, we developed items based on the questionnaires of Holman et al. (2001) and of Parker and Collins (2010). We adjusted the items to measure the extent to which beginning teachers perceived the use of learning in interaction in implementing DI (3 items). The items are rated on a five-point Likert scale ranging from 1 (never) to 5 (very often). An example item of this scale is 'Since I work at this school I asked help from my colleagues when I needed support in applying DI'. Furthermore, we developed 6 items to measure the extent to which beginning teachers change their practice toward meeting the diverse needs of the learners. These items are based on the findings of Bakkenes et al. (2010) and are scored on a range from 1 (strongly disagree) to 5 (strongly agree). An example of items measured by this scale is 'Since I work at this school I adjust the learning contents to the students' interests'.

The EFA conducted with the items of the DI professional learning activities resulted in a two-factor model. These two factors accounted for 52.5 % of the variance. The scales demonstrated good reliability: α = .82 (learning in interaction related to DI) and α = .84 (changes in DI practice). More detailed information about the items of the scale can be found in Appendix B.

Policy documents

We constructed a variable based on policy documents describing the schools' view on DI. In total, we received policy documents from 31 schools. Thirty-six schools indicated that they had no DI vision documents or that the development of vision documents was still in progress. Another five schools stated that they had vision documents but never sent us these documents.

Several scholars have indicated that well-developed documents must comply with two standards: (1) a clear definition of DI is described in the document, (2) specific DI forms are mentioned in the document and concrete examples of how to use these DI forms are described (Beecher & Sweeny, 2008; Holloway, 2000; Mills et al., 2014). After analyzing the vision documents, we found that 26 schools developed documents that met these standards. In five schools, the vision documents only mentioned briefly that giving attention to DI is important, or they contained a vague description of DI. On the basis of these findings, we created a variable with two categories (clear 1; vague or no DI vision documents 0). The 26 schools that met the standards were assigned to the first category. Schools with vague or no documents were assigned to the second category (n = 41).

Analyses

Since our data has an inherent hierarchical structure – that is, teachers are nested into schools – we used multilevel analyses (Hox, 2010). The models were fitted gradually. First, the null model, with only an intercept, was used to estimate how much of the variation in the two dependent variables (learning in interaction related to DI and changes in DI practice) could be attributed to the teacher level (level 1) and to the school level (level 2). These unconditional null models served as a baseline to which models including the study variables were compared. All variables measured on interval level were centered around their grand mean as is customary in multilevel analysis (Hox, 2010). We calculated the difference in deviance values of the subsequent models to assess the model improvement (Snijders & Bosker, 1999). The parameters of the multilevel models were estimated using Iterative Generalized Least Squares estimations (IGLS). All variables were included in the model as fixed effects, assuming that their impact does not vary from teacher to teacher or from school to school. When building the model, first the teacher education variable, the two principal leadership styles, and the three PLC characteristics were added (model 1). The mentioned variables represent the individual perceptions of beginning teachers. In the final step (model 2), we added the school-level variables diversity in

student population, educational type, and DI vision documents. Finally, in order to compare the magnitude of the different significant effects, predictor variable effect sizes (ES) were calculated. We calculated standardized coefficients following the standardized regression coefficient formula from multiple regression: ES = predictor variable coefficient*standard deviation (SD) predictor variable/ SD dependent variable (Snijders & Bosker, 1999). The analyses were conducted in MLwiN 2.29.

Results

Descriptive analyses

Descriptive statistics show that beginning teachers occasionally seek help or ask information from colleagues about DI implementation. 'Changes in DI practice' has a relatively high score, indicating that beginning teachers perceived notable changes in their teaching practice related to DI since they began work at their school. Teacher education related to DI has a high mean score. Furthermore, beginning teachers evaluate principals' transformational leadership as positive and instructional leadership as neutral. Beginning teachers frequently discuss educational issues and exchange ideas with colleagues. In addition, they feel collectively responsible for student learning. Remarkably, the mean score of 'deprivatized practice' is low, showing that teachers visit and observe each other's classrooms rarely. Table 1 gives an overview of the means, standard deviations, and the correlations.

Multilevel analysis learning in interaction

Null model

The first step in the analyses for learning in interaction related to DI was to examine the results of an unconditional two-level null model. The intercept of the null model is 3.064 and represents the overall mean for learning in interaction for all teachers across all schools. The total variance of the dependent variable equals .648 and consists of the sum of the two variance components (.033 + .615). The results state that the proportion of variance due to differences between schools was 5.1% and 94.9% of the total variance is

Table 1.*Means (M), Standard Deviations (SD), and correlations of study variables.*

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11
1. Learn. Inter.	3.07	.81	–										
2. Changes DI	3.75	.62	.339[b]	–									
3. Teach. Edu.	3.45	.82	-.158[b]	.140[a]	–								
4. Instr. Lead.	3.10	.83	.182[b]	.265[b]	.030	–							
5. Trans. Lead.	4.08	.71	.081	.246[b]	.164[b]	.537[b]	–						
6. Refl. Dia.	3.25	.61	.434[b]	.318[b]	-.008	.296[b]	.220[b]	–					
7. Depr. Prac.	2.04	.75	.281[b]	.205[b]	.163[b]	.199[b]	.222[b]	.376[b]	–				
8. Coll. Resp.	3.78	.65	.204[b]	.216[b]	.037	.291[b]	.378[b]	.394[b]	.180[b]	–			
9. Divers. Pop.	–	–	.062	.057	-.028	-.015	-.124[a]	.045	.061	-.107	–		
10. Edu. Type	–	–	.222[b]	.140[a]	-.054	-.079	.158[b]	.100	.152[a]	.268[b]	-.205[b]	–	
11. DI vision	–	–	.152[a]	.169[b]	-.013	.141[a]	.202[b]	.132[a]	.038	.239[b]	-.187[b]	.219[b]	–

Notes. [a] $p < .05$; [b] $p < .01$; *Learn. Inter. = learning in interaction related to DI; Changes DI = changes in DI practice; Teach. Edu. = teacher education related to DI; Instr. Lead. = instructional leadership; Trans. Lead. = transformational leadership; Refl. Dia. = reflective dialogue; Depr. Prac. = deprivatized practice; Coll. Resp. = collective responsibility; Divers. Pop. = diversity in student population; Edu. Type = educational type; DI vision = DI vision documents.*

situated at teacher level. The variance at school level (χ^2 = .994, df = 1, p = .319) is not significantly different from zero. However, the variance at teacher level is significant (χ^2 = 106.031, df = 1, p < .001). A possible explanation for the non-significant variance at school level could be the small number of individuals per group (average of beginning teachers per school is 4). In Flanders, beginning teachers only represent a fragmented part of the entire teaching team. More specifically, 12 schools contain just one teacher per school and another 12 schools had only two respondents per school. However, we will continue to use MLwiN for the analyses as the nested nature of the data remains.

Model 1

In this step, teacher education, the leadership variables, and the PLC characteristics were added to the fixed part of the model to predict learning in interaction related to DI. On the basis of a comparison of the deviance, model 1 fitted the data better than the null model (χ^2 = 94.207, df = 6, p < .001). The teacher education variable is negatively related to learning in interaction related to DI (χ^2 = 11.191, df = 1, p < .001). This suggests that beginning teachers who perceive that their teacher education program changed their mind-set toward DI in a positive way less frequently ask for feedback or information from colleague-teachers about DI implementation. Furthermore, reflective dialogue (χ^2 = 27.339, df = 1, p < .001) and deprivatized practice (χ^2 = 8.756, df = 1, p < .001) are positively associated with learning in interaction related to DI. These findings could imply that, the more beginning teachers discuss their educational issues and observe teaching practices of colleagues, the more they actively ask for feedback and information about the implementation of DI in their classroom. Transformational and instructional leadership as well as collective responsibility have no significant relationship with learning in interaction related to DI (p's > .05). A summary of the model estimates can be found below in Table 2.

Table 2. *Model estimates of the two-level analysis of teachers' learning in interaction.*

Parameter		Null model	Model 1	Model 2 – Final model	Effect size
Fixed	Intercept	3.064(0.054)	3.055(0.045)	2.884(0.086)	
Teacher	Teacher education		-0.171(0.051)***	-0.150(0.051)***	-.152
level	Transformational leadership		-0.063(0.077)	-0.107(0.080)	-
variables	Instructional leadership		0.087(0.064)	0.121(0.065)	-
	Collective responsibility		0.053(0.077)	0.009(0.080)	-
	Deprivatized practice		0.186(0.063)**	0.178(0.064)**	.165
	Reflective dialogue		0.433(0.083)***	0.469(0.084)***	.353
School	Low vs. high SES schools			0.0110(0.095)	-
level	Clear vs. vague/no policy documents			0.113(0.097)	-
variables	Alternative vs. traditional schools			0.374(0.130)**	.179
Random	Level 2 – school $\sigma^2\mu_0$	0.033(0.033)	0.013(0.023)	0.012(0.022)	
	Level 1- teacher σ^2e_0	0.615(0.060)***	0.464(0.045)***	0.442(0.044)***	
Model fit	Deviance	643.184	548.977	510.082	
	χ^2		94.207***	38.895***	
	df		6	3	

*Note. Per cell: regression coefficient (standard error); *p < .05, ** p < .01, *** p < .001.*

Model 2 (final model)

Educational type, DI vision based on policy documents, and diversity in student population were included in model 2 with traditional schools, vague or no policy documents, and high SES schools as respective reference categories. Compared to model 1, the inclusion of the school-level variables results in a significant model improvement ($\chi^2 = 38.895$, df = 3, $p < .001$). Educational type is positively associated with learning in interaction related to DI ($\chi^2 = 8.345$, df = 1, $p < .01$), which implies that beginning teachers in alternative schools use the professional learning activity 'learning in interaction related to DI' more frequently. DI vision documents and diversity in student population have no significant relationship with learning in interaction related to DI (p's > .05).

Multilevel analysis changes in practice

Null model

Similar to the analysis for learning in interaction related to DI, the first step in this analysis was to examine the unconditional two-level model. The intercept of the null model is 3.818, and the total variance of changes in DI practice was .238, which is the sum of the school variance (.027), and the teachers' variance (.211). It appears that 11% of the variation can be situated at school level, while 89% is attributable to differences between teachers. The null model shows that the variance at school level ($\chi^2 = 3.151$, df = 1, $p = .076$) is not significantly different from zero, whereas the variance at teacher level ($\chi^2 = 99.633$, df = 1, $p < .001$) is significantly different from zero. Again, as the nested nature of our data remains, we will continue to use MLwiN for the analyses.

Model 1

In model 1, the same teacher-level explanatory variables were included as in the analysis with learning in interaction. Model 1 fitted the data significantly better than the null model ($\chi^2 = 75.042$, df = 6, $p < .001$). Only reflective dialogue is positively related with changes in DI practice in this step

($\chi^2 = 5.195$, df = 1, $p < .05$). A summary of the model estimates can be found in Table 3.

Model 2 (final model)

In the final step of model specification, educational type, DI vision based on policy documents, and diversity in student population were added to the model. The same reference categories were selected as in the analysis for learning in interaction related to DI. Model 2 points out that by adding the school-level variables, the deviance of the model decreases significantly ($\chi^2 = 23.517$, df = 3, $p < .001$). This final step discloses that beginning teachers in alternative schools ($\chi^2 = 0.184$, df = 1, $p < .05$) and in low SES schools ($\chi^2 = 0.137$, df = 1, $p < .05$) indicate more changes in DI practice. After adding educational type and diversity in student population, the teacher education variable becomes positively significant in this step ($\chi^2 = 0.085$, df = 1, $p < .05$). This could suggest that beginning teachers who perceive that their teacher education program changed their mind-set toward DI in a positive way report more changes in DI practice. The variable 'DI vision policy documents' is not significantly related to changes in DI practice ($p > .05$).

Discussion and conclusion

Implementing DI in the classroom is a complex and demanding process for beginning teachers. To reach this goal, beginning teachers need to undertake DI learning activities in order to professionalize themselves in differentiated teaching. Previous studies identified supportive factors that can stimulate teachers' engagement in professional learning activities in general (e.g. Geijsel et al., 2009; Kwakman, 2003). However, quantitative research that contributes to the understanding of the factors that stimulate beginning teachers to engage in DI learning activities is scarce. The main purpose of this article was to examine which variables can function as environmental supportive factors to enhance beginning teachers' participation in DI learning activities.

Table 3. *Model estimates of the two-level analysis of teachers' changes in practice*

Parameter		Null model	Model 1	Model 2 – Final model	Effect size
Fixed	Intercept	3.818(0.036)	3.826(0.031)	3.681(0.056)	
Teacher	Teacher education		0.058(0.037)	0.085(0.037)*	.142
level	Transformational leadership		0.076(0.056)	0.051(0.057)	-
variables	Instructional leadership		0.067(0.043)	0.082(0.043)	-
	Collective responsibility		0.078(0.053)	0.051(0.054)	-
	Deprivatized practice		-0.005(0.043)	-0.021(0.044)	-
	Reflective dialogue		0.130(0.057)*	0.164(0.058)**	.197
School	Low vs. high SES schools			0.137(0.060)*	.140
level	Clear vs. vague/no policy documents			0.078(0.061)	-
variables	Alternative vs. traditional schools			0.184(0.082)*	.146
Random	Level 2 – school $\sigma^2\mu_0$	0.027(0.015)	0.009(0.011)	0.000(0.000)	
	Level 1- teacher σ^2e_0	0.211(0.021)***	0.184(0.019)***	0.183(0.017)***	
Model fit	Deviance	357.926	282.884	259.367	
	χ^2		75.042***	23.517***	
	df		6	3	

*Note. Per cell: regression coefficient (standard error); *p < .05, ** p < .01, *** p < .001.*

Our study reveals that teacher education is a predictor for both learning in interaction and changes in practice after adding educational type and diversity in student population. Interestingly, teacher education is differently related to the two professional learning activities. Our findings show that the more beginning teachers indicate that their teacher education program changes their mind-set toward DI in a positive way, the more they report perceived changes in DI practice. In the study of Goodnough (2010), preservice teachers are introduced to the DI principles and strategies before they are asked to design a lesson that would meet the learning needs of a diverse group of students. Goodnough found that when preservice teachers have opportunities to get insight into the theoretical framework of DI, they express more frequently that DI has a vital role in contemporary education and make use of more instructional and assessment strategies related to DI during their lessons. As scholars state that one of the primary goals of teacher preparation is to lay the foundation for beginning teachers to develop good classroom practices (e.g. van Dijk & Kattmann, 2007), it is likely that teacher education programs which provide knowledge about DI can support beginning teachers in applying different DI forms in the teaching practice. In contrast, teacher education is negatively associated with learning in interaction. A possible explanation for this result is that when beginning teachers have opportunities in their teacher education programs to reflect on and discuss their own beliefs, knowledge, attitudes, and experiences related to DI, they feel more prepared and more confident in working with diverse learners. Consequently, beginning teachers might feel less need to ask colleagues for feedback or information about DI (Buck & Cordes, 2005; Goodnough, 2010).

Moreover, we found that transformational and instructional leadership has no effect on the DI learning activities. This finding confirms the results of Wahlstrom and Louis (2008), who also found that principal leadership is not significantly related to the increased application of DI such as in flexible grouping. A possible reason for this non-significant relationship is that principal leadership indirectly affects beginning teachers' professional learning

in DI. Smit and Humpert (2012), for instance, found that leadership indirectly affects the DI practices of teachers via its relationship with team culture. However, more research is needed to explore the indirect relationship between principal leadership and the DI learning of beginning teachers.

Next, the PLC characteristics add a great deal to the explanation of the DI professional learning activities. Both reflective dialogue and deprivatized practice seem to be important in predicting the use of the professional learning activity 'learning in interaction related to DI'. This finding is similar to previous research which indicates that social and interpersonal dynamics can be influential for learning in interaction (Newman, 2006). Reflective dialogue is also critical in determining changes in DI practice. This finding is in line with the study of Parise and Spillane (2010), who identify collaborative discussion between teachers as a strong predictor of change in classroom practices. Unlike learning in interaction related to DI, deprivatized practice has no significant relationship with changes in DI practice. This indicates that the PLC characteristics have a differential influence on the DI learning activities. Neither learning in interaction nor changes in practice is affected by collective responsibility. The fact that collective responsibility functions as a mental structure that governs professional behavior rather than being a collegial activity might explain why collective responsibility cannot be distinguished as a factor that stimulates beginning teachers' participation in DI learning activities (Bryk et al., 1999).

The variable 'diversity in student population' reveals a significant effect on changes in practice which mirrors the statement of Timperley (2008) that factors such as diversity in student population are strongly related to what and how teachers teach. Remarkably, diversity in student population does not have an effect on learning in interaction. This finding is in line with a study by Goddard et al. (2010), who found that the percentage of minority students and the percentage of students eligible for free or reduced-price lunch (a proxy for low SES background) are not related to the degree to which DI is the norm in the schools. As classes with a diversity in student population require more DI

skills, it seems plausible that the existence of a general interest or norm toward DI among the teaching team is a condition that has to be fulfilled before it is possible for beginning teachers to discuss effective DI skills with colleagues and to ask for feedback and information on DI implementation. Given that diversity in student population has no effect on the degree to which DI is the norm in schools, it makes sense that diversity in student population has no effect on learning in interaction.

Concerning the school policy variables, our study suggests that educational type is significant for both professional learning activities. This finding is not surprising because alternative schools attach greater importance to the individual experiences and interests of pupils than traditional schools (Rathunde & Csikszentmihalyi, 2005; Verhaeghe & Gadeyne, 2004). Hence, the belief in DI and the application of DI in the classroom are embedded in the pedagogical vision and the teaching methods of alternative schools, which is an extra motivation for beginning teachers in alternative schools to professionalize in DI. In contrast, policy documents toward DI of a school are unrelated to the DI learning activities. Similarly, J. Cohen, McCabe, Michelli, and Pickeral (2009) declare that giving greater priority to a certain educational approach in a school requires more than developing or changing the nature of policy documents. J. Cohen et al. (2009) stress that it is essential to take into account the schools' capacity to implement the policy dimensions and that the variance in teachers' interpretations and the cognition of the policy content should be considered. Furthermore, Ainscow (2005) put forward that policy documents serve as a memory of practice rather than directly stimulating new learning. Lastly, Levin (1998) states that the road from formal policy documents to actual practice is rarely a straight one as it is seldom free of inconsistencies and contradictions. As such, it seems that the pedagogical vision in alternative schools is more important than formal DI vision policy documents as a policy variable that stimulates professional learning in DI.

Although we believe our results are important and contribute to a better understanding of the complex process of DI implementation, our study

is bound by a number of limitations, and further research is needed. First, the teacher variables in our model are measured using single source methods. To meet this limitation, we used three school variables as independent variables. The variable we conceptualized based on the policy documents could not be identified as a significant supportive factor. Inevitably, the standards we used to score this variable involves choices, which means certain aspects of the policy documents are not taken into account (e.g. who was involved in developing policy documents and to what degree policy documents are used to put DI into practice). Hence, qualitative research is needed to fully explore the effects of policy documents on beginning teachers' professionalization in DI.

In line with the first limitation, a second limitation of our study is that we relied on self-reported data for the professional learning activities. As teachers might provide socially desirable answers to these items, different methods could be used to measure the actual amount of professional learning activities beginning teachers undertake to increase their DI professionalization. A qualitative research design might be useful in this regard (e.g. observations and logbooks).

A third limitation is the relatively small and varied number of beginning teachers per school. As such, the results, in particular the p-values, should be interpreted with caution. Future research with a larger and equal sample of beginning teachers per school is needed to affirm the findings of this study.

Taking into account these limitations, we do believe this study reveals some important findings, which can have interesting implications for practice.

First of all, our study indicates that teacher education can be important in providing the foundational knowledge on DI applications. Also, we believe that teacher educators should work together with schools to check if the DI examples that are provided in the lessons are authentic and realistic. In Flanders, student teachers fulfill their internship to a limited extent in schools with a difficult or diverse student population, but spend a considerable part of their internship in high SES schools where they teach 'average learners'

(Flemish Department of Education and Training, 2012, 2013). However according to the latest Teaching and Learning International Survey (TALIS) report, a majority of beginning teachers in Flanders end up in more challenging schools (OECD, 2014). Furthermore, the practical training of first-year students in the teacher training program is centered around microteaching, which means that student teachers will teach for their peers and teacher educators (Flemish Department of Education and Training, 2012). Therefore, it is important that teacher education collaborates with schools in order to give preservice teachers the opportunity to enter the field earlier and get experience of how to organize differentiated teaching in a real situation.

Moreover, the study shows that alternative schools and low SES schools succeed better in stimulating beginning teachers to engage in DI professional learning activities. As such, these schools develop DI expertise which can be shared with traditional schools or high SES schools. More qualitative research is needed to analyze in detail how the differences between alternative and traditional schools and between low and high SES schools can be interpreted. More specifically, it is important to clarify if the importance of alternative schools to the professional learning of beginning teachers is attributable to their specific pedagogical vision, the high commitment of all actors (i.e. teachers, principal, parents, etc.), or the way alternative schools group their students.

Additionally, schools have to encourage beginning teachers to engage in in-depth-conversations and have to create opportunities to share knowledge and experience of DI with colleagues. Lastly, it is crucial that beginning teachers have opportunities to observe good teaching practices so that they are encouraged to ask for information and help during their personal progression toward differentiated teaching. Therefore, to realize one of the most important elements of induction arrangements (i.e. regular scheduled collaboration with other teachers), schools could provide beginning teachers with class-free hours so that they get the chance to visit other teachers' classrooms. According to Helms-Lorenz and Maulana (2015), induction arrangements can be regarded

as a form of social and professional support for beginning teachers in order to become competent and effective professionals.

In sum, our study has indicated that specific school factors (i.e. deprivatized practice, reflective dialogue, diversity in student population, and educational type) and, to some degree, teacher education as a contextual factor matter for the professionalization of beginning teachers in DI. By strengthening these environmental factors and by stimulating the interaction between schools and teacher training institutions, beginning teachers' development of professional learning in DI can be improved.

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Appendix A

Results of the Exploratory Factor Analysis of teacher education related to DI items (*n* = 270)

Item description	Factor 1
Due to my teacher education program I find it practicable to apply differentiated instruction in my lessons.	.70
Due to my teacher education program I have acquired sufficient knowledge to apply differentiated instruction in my lessons.	.95
Due to my teacher education program, I can make an estimate on how I should apply differentiated instruction in my classes.	.90

Appendix B

Exploratory factor analysis of the professional learning activities related to DI items (*n* = 267)

	Factor Loadings	
Item description	Learning in interaction	Changes in practice
Since I work at this school…		
… I asked more information and ideas about differentiated instruction to my colleagues when I needed it.	.74	
… I asked help from my colleagues when I needed support in applying differentiated instruction.	.92	
… I seek feedback from colleagues about how I apply differentiated instruction in my lessons.	.69	
… I use more different group configurations in my classroom to meet the specific learning needs of my students.		.72
… I better match my instructional strategies to the specific learning needs of my students.		.68

Appendix B (continued)

Item description	Factor Loadings	
	Learning in interaction	Changes in practice
... I use more varied lesson material so that I can meet the specific learning needs of my students.		.66
... I use more different assessment forms to meet the differences between my students.		.57
... I better match the pace of learning of my students to their specific learning needs.		.80
... I better match the learning contents to the students' interests.		.69

Chapter 4

How do professional learning communities aid and hamper professional learning of beginning teachers related to differentiated instruction?[1]

Abstract

Research has shown that adequate support from the school environment is necessary to help beginning teachers in applying differentiated instruction (DI), but how schools can aid in this process remains unclear. This qualitative study explores how professional learning communities (PLCs), an indicator of a supportive school environment, enhance beginning teachers' professional learning in DI. Moreover, this study examines how structural and cultural school conditions foster the development of PLCs in the schools' organization (see Figure 1). Semi-structured interviews were conducted with school leaders, special needs coordinators, and beginning teachers in primary schools. A comparative analysis was carried out in three schools with high, medium, and low levels of beginning teachers' professional learning in DI. The analysis indicated that the three cases could be situated at different stages of PLC development. Also, the structural and cultural school conditions in the three cases were related to the different stages of PLC development. Finally, the results revealed that in the three cases principal leadership played a key role in the development of the structural and cultural school conditions.

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[1] Based on De Neve, D., & Devos, G. (accepted). How do professional learning communities aid and hamper professional learning of beginning teachers related to differentiated instruction? *Teachers and Teaching: Theory and Practice*.

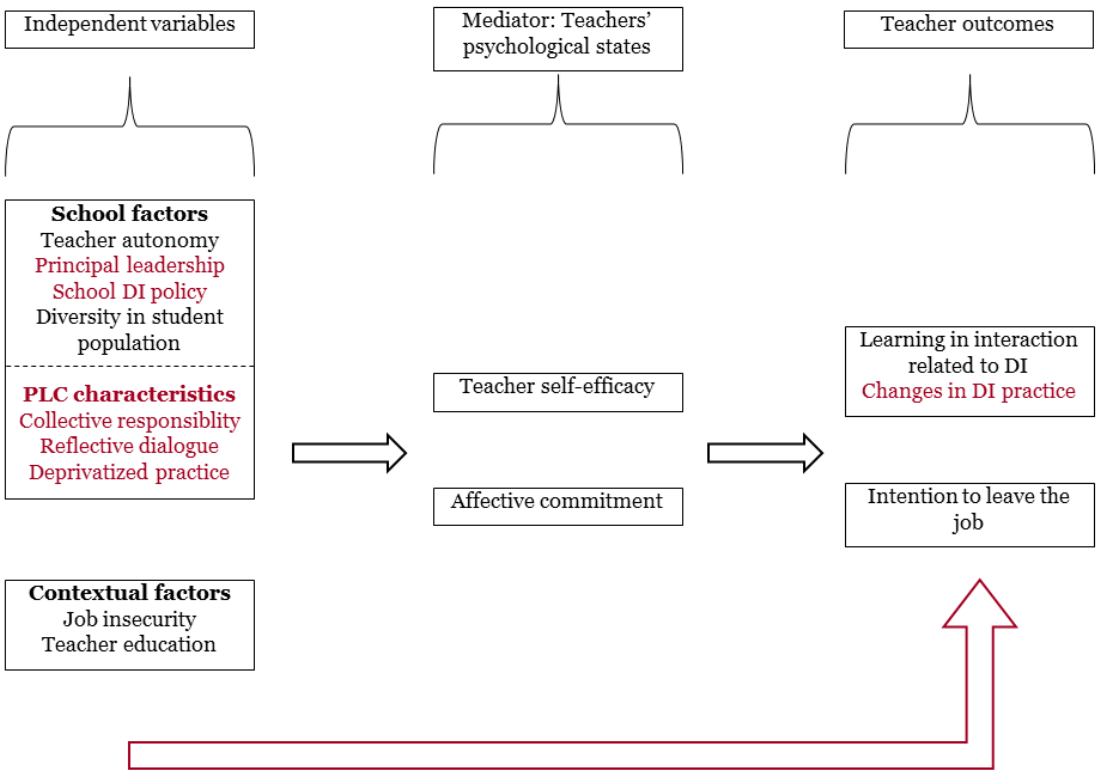

Figure 1. Chapter 4 situated in the guiding framework of this dissertation

Introduction

In their new role as a teacher, novices need to fulfill a multitude of tasks and encounter new expectations (Fantilli & McDougall, 2009; Jokinen, Heikkinen, & Morberg, 2012). In contrast to careers in other fields, where newcomers begin with minor responsibilities and gradually acquire more challenges and duties, beginning teachers are given full pedagogical and legal responsibility when they start teaching (Tynjälä & Heikkinen, 2011). One of the most difficult tasks beginning teachers face is applying differentiated instruction (DI) in the classroom (e.g. Mansfield, Beltman, & Price, 2014). DI is defined as a pedagogical approach to teaching that focuses on meeting the diverse students' needs and interests by adapting the learning activities, the learning tasks, and the pace of the lesson (Tomlinson et al., 2003). In recent years, research shows that when schools offer opportunities to collaborate with colleagues, teachers succeed better in meeting challenges like adapting teaching to student differences (e.g. Dunne, Nave, & Lewis, 2000; Fogarty & Pete, 2011). Schools that provide collaborative opportunities are identified as professional learning communities (PLCs) (e.g. Lomos, 2012). Investigators have started to explore school conditions that are in general important to develop a well-functioning PLC (e.g. Stoll, Bolam, McMahon, Wallace, & Thomas, 2006). In addition, certain indications of relevant school conditions to facilitate DI implementation have been made (e.g. Holloway, 2000; Tomlinson et al., 2003). In both general and specific DI related school conditions two major dimensions can be identified: the structural and the cultural dimension (van den Berg, Vandenberghe & Sleegers, 1999). The structural dimension is characterized by clarity of formalized procedures and stresses the adoption of a rational, systematic, and coordinated strategy. The cultural dimension refers to informal and personal communication, trust, unity and shared values. In this study, we developed a framework in which we situated the structural and cultural school conditions and explored if this framework might explain why there are differences in PLC development and DI learning of beginning teachers. For this purpose, we compared three cases that

differ with regard to levels of beginning teachers' professional learning in DI and investigated how PLC characteristics (i.e., reflective dialogue, collective responsibility, and deprivatized practice) are put in practice in these schools.

Theoretical framework

The increasing call for differentiated instruction

The last several years have witnessed an increasing call from policymakers to apply DI in the teaching practice (e.g. Humphrey et al., 2006). Also in Flanders (Belgium) policy initiatives to encourage DI and the inclusion of students with special educational needs in mainstream education is visible. In 2014, the Flemish government approved the M-decree which allows students with disabilities to attend classes in mainstream education. To become effective, this policy decision requires schools and teachers in mainstream education to develop new knowledge and expertise with regard to DI implementation. Implementing DI is a complex process (Pettig, 2000) that necessitates a stepwise approach. Studies by van de Grift, van der Wal, and Torenbeek (2011) and van de Grift, Helms-Lorenz, and Maulana (2014) have indicated that teachers first need to master basic skills like efficient classroom management before they can develop more complex teaching skills like differentiated teaching. As beginning teachers are focused on survival and mastering the basic principles of teaching, they in particular, experience the use of DI as a major challenge (Fantilli & McDougall, 2009; Mansfield, Beltman, & Price, 2014). Specific difficulties beginning teachers experience are planning different DI forms in every lesson and being flexible in terms of assessment. Beginning teachers express that a lack of curriculum support and supplementary resources that must be offered by the school, impede the preparation of DI lessons (Goodnough, 2010; Tobin & Tippett, 2014). Adequate support from the school seems essential in beginning teachers' professional learning in DI. Several authors have acknowledged that teachers' changes in practice, or in other words how flexibly teachers adapt their classroom behavior to the individual needs of the students, is a good indicator for teachers' professionalization in DI (Bakkenes, Vermunt, & Wubbels, 2010; Geijsel,

Sleegers, Stoel, & Krüger, 2009). Dunne, Nave, and Lewis (2000) have declared that teachers who participated in collaborative settings used more student-centered practices over time such as flexible classroom grouping and adapting the pace of instruction to the students' individual needs.

Characteristics of professional learning communities

According to Little (2012) research points out that teachers, who are offered, rich learning opportunities teach in more ambitious and effective ways. More specifically, research has shown that a school's ability to improve and to increase teacher learning depends on its capability to function as a PLC (Borko, 2004; Morrissey, 2000). The PLC concept has gained considerable attention in the last three decades. A PLC is a school organization in which a group of professionals critically shares and interrogates its practice in an ongoing, reflective, and collaborative way focusing on professional growth and with an orientation on learning (Stoll et al., 2006). Based on an extensive review of more than 60 articles on the measurement of PLCs, Lomos (2012) has identified the Teacher's Professional Community Index of Wahlstrom and Louis (2008) as the instrument that best met her analysis criteria. In her own validity study Lomos identified the concept of a PLC as a multidimensional entity including 'reflective dialogue', 'collective responsibility', and 'deprivatized practice'. In previous research, on grounds of demonstrated exploratory and confirmatory factor analysis, we also have found the three characteristics Lomos retained in her validity study (De Neve, Devos, & Tuytens, 2015). *Reflective dialogue* refers to the in-depth discussions teachers have with colleagues about educational issues for instance students' intellectual growth. *Deprivatized practice* means that teachers define their practice openly and make their teaching public with the aim of giving and receiving feedback. *Collective responsibility* has been defined as the extent to which the members of the school team are committed to the goals of the school, particularly related to student learning (e.g. Kruse, Louis, & Bryk, 1995; Louis, Marks, & Kruse, 1996; Newmann & Wehlage, 1995; Wahlstrom & Louis, 2008). It is important to recognize that PLCs are affected by contextual differences. For instance,

Lomos, Hofman, and Bosker (2011) have pointed out that PLCs in secondary schools are organized in subject departments whereas PLCs in primary schools are based on the collaboration between all members of the school team. Furthermore, McLaughlin and Talbert (2001) have distinguished beginning PLCs from mature PLCs. In beginning PLCs classroom work remains private while in mature PLCs teachers have a set of collective commitments toward teaching and learning and share their classroom work. The mature PLCs are subdivided into tradition-oriented mature PLCs and teacher learning PLCs. The first type of mature PLCs refers to the unity among teachers to preserve their preferred, rather conservative, conceptions of pedagogy, and instruction and hold on to these ideas despite student failure. The latter type applies a more dynamic and flexible perspective on teaching and routinely questions and challenges teaching practice when students fail. As such, it is crucial that schools function as a 'teacher learning PLC' in order to meet the diverse needs of their students. In the theoretical framework, we refer to teacher learning PLCs when we use the concept of PLCs.

PLC: A context for teachers' professional learning in DI

As previously mentioned, PLCs can foster teachers' professional learning and in turn are more likely to be effective in supporting high levels of student achievement (Borko, 2004; Little, 2012). In particular, Orlich et al. (2013) have argued that reflective dialogue through collaborative meetings and teamwork can make the work of preparing DI lessons more rewarding because it allows teachers to provide feedback and share expertise. Also, co-teaching enables teachers to give more attention to each student individually. Furthermore, a study by Wahlstrom and Louis (2008) has found that collective responsibility, reflective dialogue, and deprivatized practice are important in determining the use of flexible grouping practices. While studies such as the one of Wahlstrom and Louis (2008) and Orlich et al. (2013) have focused on professional DI learning of mixed experienced teachers, there is little consideration of how PLCs stimulate beginning teachers' learning in DI.

School conditions

If PLCs can be important leavers to stimulate beginning teachers' learning, it is crucial to understand how schools can foster and maintain PLCs (Louis, Marks, & Kruse, 1996; Stoll et al., 2006). A reoccurring theme in the PLC literature is the need for a supportive structural environment (e.g. Sleegers, den Brok, Verbiest, Moolenaar, & Daly, 2013). Stoll (1999) states that schools are bounded by structural school conditions shaping an organizational capacity to create a PLC and respond to educational change. However, according to Creemers (2002) a solely focus on structural school conditions will only result in short-lived and superficial educational changes. Cultural school conditions that increase the social capacity of schools are also essential to develop a PLC (Kruse et al., 1995). Although empirical research that analyzed which structural and cultural school conditions facilitate PLCs and DI learning of beginning teachers is scarce, certain scholars have referred to specific school conditions that can be considered as important stepping stones in the development of such a professional learning environment.

Structural school conditions

Structural school conditions that have been advocated in the PLC literature and benefit educational change (e.g. Fullan, 2001; Louis, Marks, & Kruse, 1996) are integrated as components of our analytic framework. Schools that are more successful in improvement projects mainly pay attention to provide time for people to meet and plan together and restructure existing arrangements in order to facilitate the change process (Stoll, 1999).

Scheduling planning time

Teachers who use their time for collaborative development are thought to reflect a sense of PLC. While teachers have been engaged in collaboration based on their personal initiatives (Little, 1982), research on school effectiveness emphasized the importance of formally scheduled time during the school hours to evolve PLCs and sustain innovation (Cranston, 2009; Owen, 2014; Sleegers et al., 2013). A study by Tomlinson (1999) has found that when

schools provide scheduled time to support teachers' planning for differentiation, DI has been implemented more smoothly and profoundly. In addition, Stoll and Fink (2003) have stated that formalized time to talk about professional issues is crucial for any non-superficial learning.

As a PLC grows, teachers not only need common time to collaborate within specific teaching teams in order to address issues related to student concerns. They also need time to meet with the entire school team and discuss school-wide goals and values (Louis et al., 1996).

Organizational decisions to facilitate DI implementation

Organizational decisions can also facilitate DI implementation. For example, research on class sizes suggests that when the student class size is reduced, teachers spent more time on individual instruction or instruction for smaller groups within the classroom (Leithwood, Seashore Louis, Anderson, & Wahlstrom, 2004).

Cultural school conditions

The way people perceive, think, and feel about the school are embedded in the cultural school conditions. In particular, cultural school conditions are characterized by cohesion and trust and values and vision shared by the school members (van den Berg et al., 1999).

Trust

Without trust teachers are unlikely to participate in discussions about pedagogical issues and observe each other's classroom and provide feedback (e.g. Atteberry & Bryk, 2011). Additionally, trust needs to be established before people feel able to participate actively in improvement efforts and concentrate on learning and teaching (Stoll & Fink, 1996). When trust is lacking, change efforts such as DI implementation may become contrived and have no long-term impact (Hargreaves, 1994; Tomlinson, 1999).

Creating and maintaining DI vision

Developing a vision on DI can help to orient the discussions of the team members on the implementation of DI. A sensible vision helps to clarify the direction in which an organization wants to move. Without a good vision, transformation efforts easily result in inconsistent initiatives that can take the organization in the wrong direction or nowhere at all. Besides creating a DI vision, it is equally important to maintain the vision. Here, it seems essential that schools set clear expectations about how beginning teachers differentiate instruction and take sufficient time to make sure that the next generation of teachers internalize the DI vision of the school (Holloway, 2000; Kotter, 2007). If schools succeed to build a vision that is accepted among the team teacher collaboration can be boosted (Hopkins & Stern, 1996).

Principal leadership

Leadership by principals is an essential element to build a PLC (e.g. Wahlstrom & Louis, 2008). Leithwood et al. (2004) have indicated that principals contribute to school improvement in an indirect way by shaping the nature of the school conditions that can develop a PLC. In the structural-functional perspective on innovation the role of the principal is managerial in nature. As such, school leaders mainly focus on creating a formalized structure for communication among the members of the school team and structurally monitor the implementation of the policy (van den Berg et al., 1999). According to Wahlstrom and Louis (2008) and Youngs and King (2002) principals play a crucial structural role in allocating time for teachers to meet so that reflective dialogue and deprivatized practice occur more frequently. In addition, in order to foster PLC development and implement policy changes a different style that is less directed at planning and organizing and more directed at stimulating interaction and dynamics is needed (van den Berg et al., 1999). In the cultural perspective on leadership, the role of the principal is to shape a school culture. Consequently, principals focus on creating an environment of mutual responsibility and accountability for supporting teachers and students,

stimulate and coordinate professional activity within the school, and sustain a vision on schooling that emphasizes dignity (Kruse & Louis, 2009). Scholars have suggested that when principals succeed to evolve a vision of learning, that is supported by the entire team and is based on consensus regarding common interests and goals, unity within the team is created (DuFour, DuFour, & Eaker, 2008; Senge, 2006). Therefore, this process is a solid base to establish a sense of collective responsibility. As such, principals' leadership can either facilitate or hinder the establishment of PLCs.

Likewise, DI studies have emphasized the cultural perspective on school leadership. Research stresses that principals must have a good understanding of DI, must realize a common orientation on DI among teachers, and need to provide support for teachers to use DI (Tomlinson et al., 2003; Tomlinson, Brimijoin, & Narvaez, 2008).

Teacher leadership

The cultural perspective on principal leadership also refers to the degree to which principals broadening the meaningful involvement of others in the leadership process, delegate responsibilities, and share leadership functions (e.g. Kruse & Louis, 2009; Sleegers et al., 2013). In this way, teacher leaders become the right hand of the principal and enhance the social capacity of a school. Lieberman and Pointer Mace (2009) and Muijs and Harris (2003) have indicated that teacher leaders are important to accomplish change. Tomlinson (1999) has stated that school leaders cannot translate the principles of differentiation into the classroom practice on their own but that an efficient approach for starting differentiation is to build a cadre group who creates links between the DI principles and practical action. Furthermore, Carolan and Guinn (2007) have pointed out that teacher leaders, who are DI experts, provide an invaluable resource for teacher learning.

Day and Harris (2003) have defined four dimensions of teacher leadership. Firstly, teacher leaders focus on the transfer of the school improvement principles into the individual classroom practices. The second dimension concerns participative leadership as such that all teachers feel

involved in the change or development and have a sense of ownership. Thirdly, teacher leaders function as important sources of information and expertise. Lastly, it is crucial that teacher leaders close relationships with individual teachers to evolve mutual learning.

We suggest that the abovementioned school conditions develop and maintain PLCs and enable DI implementation. However, qualitative research is important to get insight in (a) how these school conditions are generated in schools, (b) how vital they are for the development of a PLC, and (c) how school conditions and PLC development are associated with beginning teachers DI learning.

Purpose of study

This study aims to clarify which specific role structural and cultural school conditions and PLCs play in DI learning of beginning teachers and explore how both sets of school conditions support PLC development. We examine the differences in the PLC characteristics and the structural and cultural school conditions in three specific cases by means of semi-structured interviews.

Building on the developed framework, the following research questions are put forward:

1) How are differences in PLC development related to beginning teachers' professional learning in DI?
2) a. How do structural school conditions foster PLC development?
   b. How do cultural school conditions foster PLC development?
3) How is principal leadership related to the elaboration of structural and cultural school conditions?

Methods

Data sampling and participants

The present study is preceded by a quantitative study on the relationships between PLC characteristics and beginning teachers' professional learning related to DI in 65 Flemish primary schools. This study found that

reflective dialogue directly and collective responsibility indirectly influences changes in DI practice (i.e. an indicator for professional learning in DI) (De Neve et al., 2015).

The starting point of the qualitative follow-up was the professional learning of beginning teachers based on high, medium, and low scores on the changes in DI practice scale obtained in the abovementioned quantitative study. Based on these inter-school differences in DI learning of beginning teachers, we aimed to examine differences among these schools regarding their PLC characteristics. To select the schools we calculated a mean score for each of the 65 schools, based on the individual self-reported changes in DI practice of beginning teachers, and ranked the 65 schools. The means reflected scores that can range from 1 (low score) to 5 (high score). For this exploratory study, we selected one prototypical case per subset (high, medium, low) to explore how the three groups of schools differed and to make a cross-case analysis (Creswell, 2008; Tashakkori & Teddlie, 1998). Hence, we selected case A, B, and C respectively from the high, medium, and low subset. Out of the 65 schools, case A was ranked 15th (mean = 4.04), case B was ranked 34th (mean = 3.75), and case C was ranked 61st (mean = 3.02).

Semi-structured open-ended interviews were administered from the school leader, the special needs coordinator, and two to three beginning teachers in the three schools. The triangulation of perceptual viewpoints helped to validate the responses from the different subgroups. Teachers were considered as beginning when they had been in service for minimum three months and maximum five years in the participating school at the time of the quantitative data collection (Huberman, 1989). In total, 14 participants out of the three schools were included for this study. Table 1 shows how many participants per case were interviewed and displays the demographic characteristics of each participant.

Table 1. *Demographic characteristics of participants (n = 14)*

School	Position	Years of school experience	Gender	Education
Case A	School leader	11 years	Male	Primary education
Case A	Special needs coordinator	9 years	Female	Physiotherapy
Case A	Beginning teacher	2 years	Female	Kindergarten
Case A	Beginning teacher	1 year	Female	Primary education
Case B	School leader	16 years	Male	Primary education
Case B	Special needs coordinator	12 years	Female	Primary education
Case B	Beginning teacher	1 year	Female	Primary education
Case B	Beginning teacher	2 years	Female	Primary education
Case B	Beginning teacher	1 year	Female	Primary education
Case C	School leader	6 years	Male	Secondary education
Case C	Special needs coordinator	35 years	Female	Primary education
Case C	Beginning teacher	3 years	Female	Primary education
Case C	Beginning teacher	2 years	Female	Kindergarten
Case C	Beginning teacher	1 year	Male	Primary education

Instrument and data analysis

An interview protocol based on the research objectives was set up for the semi-structured open-ended interviews. The used interview protocol focused on the PLC development, aspects that facilitate PLC development, and aspects that foster DI learning of beginning teachers. Questions related to PLC development were for example 'Do teachers often have conversations with each other and exchange ideas?'. Questions concerning aspects that facilitate PLC development were for instance 'Does the principal create sufficient opportunities for teachers to interact with one another?'. Lastly, questions as 'Is there a specific policy on differentiated instruction in this school?' were

asked to get insight into the aspects that foster DI learning of beginning teachers. On average the interviews lasted 1 to 1.5 hours each.

All interviews were transcribed verbatim and in total, we had 180 pages of transcription. We used different steps to analyze the interview data and the Nvivo 10 software tool was used to organize our analysis. First, thematic summaries were created in order to structure the extensive text and reduce the data (Miles & Huberman, 1994). These summaries included three broad categories namely 1) PLC development, 2) aspects that facilitate PLC development, and 3) aspects that foster DI learning of beginning teachers. Second, deductive coding based on studies of for instance Lomos (2012), Stoll et al. (2006), and Tomlinson et al. (2003) was used to refine the broad categories. In order to create subcategories we spend considerable time reading and rereading all interview transcripts. In the category PLC development the subcategories reflective dialogue, deprivatized practice, and collective responsibility were distinguished. The second broad category included the subcategories principal leadership, teacher leadership, the structural school condition 'scheduling planning time' and the cultural school condition 'trust'. The third broad category was refined into the subcategories principal leadership, teacher leadership, the structural school condition 'organizational decisions to facilitate DI implementation' and the cultural school condition 'creating and maintaining DI vision'. In total, there were two units of analysis namely the individuals (e.g. beginning teacher) and the schools (i.e. all interviewed members of one school). The first round of the data analysis was a within-case analysis and consisted of coding each separate participant as a single case. In the cross-case analysis, the second round of the analysis, all interviewees in one case were compared and contrasted and common or different patterns were identified. Third, communalities and differences were sought through a second cross-case analysis that compared and contrasted the three cases. This approach facilitated the application of the constant comparative method (Glaser & Strauss, 1967) to identify emerging themes (Miles & Huberman, 1994).

The first author coded all interviews and a second researcher (who was not familiar with the study) coded 3 of the 14 interviews, which is in accordance with the standard of 20%. The second coder was trained to grasp the meaning of the coding scheme, but did not receive any information on the subset (high, medium, low) the school belongs to. The intercoder-reliability was .86, which is comparable to the standard of 80%.

Results

The present study selected schools based on differences in beginning teachers' DI learning. Beginning teachers in case A reported strong changes in their teaching practice related to DI since they started as a teacher in their school. In case B medium scores on the changes in DI practice scale were reported whereas beginning teachers in case C indicated few changes in DI practice. In this section, we analyze the differences between the PLC characteristics of the three cases. Next, we describe how the structural and cultural school conditions are related to these different PLC characteristics. Finally, we explain how the school principal plays an important role in the development of the structural and cultural school conditions. The main findings are summarized in Table 2.

Characteristics of PLCs

The cases differ with regard to the PLC characteristics, especially for reflective dialogue and collective responsibility.

Reflective dialogue. The results pointed out that communication among the team members occurred in all schools but the content of the conversations largely differed. Regarding case C, teachers tended to discuss more practical matters, whereas teachers from case A and B talked more about pedagogical content knowledge and didactics besides the practicalities.

> *"Colleagues sit together during the physical education hour to schedule their lesson planning." (Beginning teacher, Case C)*

Table 2.*Summary of the study findings.*

	Case C	Case B	Case A
Stage of PLC development	*Beginning stage*	*Evolving stage*	*Mature stage*
Reflective dialogue	Practical issues	Practical issues Pedagogical didactics	Practical issues Pedagogical didactics Discussing issues related to DI
Collective responsibility	Sense of individualism Identification with subgroups	Sense of individualism Collective school norms	No sense of individualism Strong sense of collective responsibility
Deprivatized practice	Few initiatives Reason: Resistance teaching team	Few initiatives Reason: Resistance teaching team	Few initiatives Reason: Organizational restrictions
Structural school conditions			
Scheduling planning time	Informal initiatives of teachers	Formal scheduled time organized by principal	Informal initiatives of teachers Formal scheduled time organized by principal
Organizational decisions to facilitate DI implementation	Individual initiatives of teachers	No initiatives of teachers or principal	Organizational decisions by principal

Table 2 (continued)

	Case C	Case B	Case A
Cultural school conditions			
Trust	No trust to open classroom doors, share teaching materials, discuss educational issues Principal and special needs coordinator find it difficult to increase level of trust	Trust to discuss educational issues No trust to open classroom doors Principal and special needs coordinator tried to increase level of trust	Trust to share teaching materials, discuss educational issues, open classroom doors Principal and special needs coordinator rely on level of trust
Creating and maintaining DI vision	Guided by principal	Guided by principal and school policy staff	Guided by principal, special needs coordinator, and experienced teachers
Teacher leadership	Special needs coordinator has no teacher leadership characteristics	DI expert Close relationships with individual teachers	DI expert Close relationships with individual teachers Create participative leadership
Principal leadership	Low on structural dimension Low on cultural dimension	High on structural dimension Moderately on cultural dimension	High on structural dimension High on cultural dimension

> *"Teachers of the same grade have weekly meetings with one another to schedule their lesson planning. Additionally, teachers have weekly class free hours to meet with us. During these meetings we will guide the beginning teachers to use for instance alternative teaching methods." (Special needs coordinator, Case B)*

Besides the earlier mentioned forms of reflective dialogue, we found that teachers from case A were strongly involved in discussing issues on DI and how these didactics were related to the school vision on learning.

Collective responsibility. In case C the respondents stated that there was a lack of collective responsibility among members of the teaching team. Teachers of grade 1 to 3 applied different rules of student discipline than teachers of grade 4 to 6. Also, the teachers seemed to focus more on their own classroom practice and often worked individually.

> *"We have a specific system to maintain discipline in our school. When pupils for instance refuse to come over when the teacher is calling them, they risk a yellow or red card. We see that teachers of grade 1 to 3 give more yellow cards although we don't have the naughty pupils. The difficult classes are situated in grade 4 to 6. I notice that the entire team is not always singing from the same hymn sheet." (Beginning teacher, Case C)*

Respondents of case B pointed out that they experienced a sense of collective responsibility during conversations and meetings for what happens in the school. However, also in this school, interviewees stated that teachers focus on their own classroom if the inspectorate conducts an audit which suggests an individual focus. In case A we found a strong sense of collective responsibility. Respondents in this school indicated that the entire team took responsibility for improving the school outside their own class and saw this as a matter of course.

> *"I think this type of school can only subsist if you carry it together, work together, but also reflect together and have a critical look at how the school works. And it also happens like that." (Beginning teacher, Case A)*

Deprivatized practice. We found few initiatives of deprivatized practice in all schools. However, the main reason why deprivatized practice did not occur frequently differed among the cases. Interviewees from case B and C reported that deprivatized practice did not take place because teachers showed resistance to open their classroom doors. In case A respondents stated that deprivatized practice did not happen on a regular basis due to organizational restrictions such as the small size of the teaching team.

Based on these results we could situate case C in the 'beginning stage' of PLC development while case B and case A can be allocated respectively to the 'evolving stage' and 'the mature stage' of PLC development. These stages of PLC development differently affect the learning process of beginning teachers in DI.

In case C, where beginning teachers scored low on changes in DI practice, beginning teachers referred to the little effort of the school team in order to help beginning teachers to realize DI implementation.

> *"I've been in a number of classes and never there is lesson material to differentiate. I don't know why but a lot of times I have to start from scratch while there needs to be someone within the team that developed DI material before." (Beginning teacher, Case C)*

Beginning teachers in case B indicated that their colleagues to a certain extent help them to professionalize in DI while beginning teachers in case A emphasized the diversity of actions within the school team that fostered their professionalization in DI.

"I find the use of DI very complex but the team strongly supports me. I can discuss problems and concerns with my colleagues, colleagues offer me lesson material and involve me in DI initiatives that already started" (Beginning teacher, Case A)

Structural school conditions

The organization of *scheduling planning time* varied across schools. Interviewees of case C declared that teachers' collaboration was mainly based on their own initiatives. However, they did not feel the need that the principal organized extra formal scheduled time. Respondents of case B stated that collaboration was centered around formal scheduled time during the school hours organized by the principal whereas the results of case A revealed that scheduled planning time was alternated with strong personal initiatives to collaborate.

Furthermore, we saw that in all cases formal scheduled time was given to teachers of parallel classes or teachers in the higher or lower grades to collaborate with one another. However, these initiatives were strongly limited in case C. Respondents of case A and B indicated that teachers also got time to collaborate with the special needs coordinator or with the school policy staff in order to discuss problems or ideas related to DI implementation. Lastly, we found for case A that the entire teaching team formally collaborated on a regular basis. As such, the principals of school A and B offered scheduled time for teachers to make reflective dialogue possible.

Based on our findings we can conclude that case A had a strong structure to collaborate at several levels which stimulates the development and maintenance of a PLC.

"On Monday during lunchtime the kindergarten teachers sit together. Tuesday the primary school teachers have an assembly during lunchtime. Thursday the entire team of nursery and primary school teachers will meet in the afternoon every two weeks" (Principal, Case A)

> *"We also have those small talks like 'What are you doing now with the youngest group of toddlers?' We build on those conversations and hear from each other how we do it." (Beginning teacher, Case A)*

The data showed that differences between case A on the one hand and case B and C on the other hand existed for *organizational decisions that facilitate DI implementation*. In case C the principal indicated that individual initiatives of one grade had an impact on other grades.

> *"I'm happy to notice that there are 'little oil stains' that are spread out across several grades. One grade developed the 'frog map' that is used to provide more challenging or revision exercises for pupils and now I see that other grades use this map as well." (Principal, Case C)*

Likewise, we found few organizational decisions that facilitated DI implementation in case B. In line with this, the principal stated the following:

> *"It's out of the question to separate one class into two classes. We will not make our groups smaller, because the problems you face with 18 children will be the same if you have 22 children." (Principal, Case B)*

The interviewees from case A demonstrated that the class size was reduced and multigrade teaching had been introduced to enable DI implementation. This last initiative also facilitated deprivatized practice, which in turn, fostered DI learning of beginning teachers.

> *"I noticed by working with a group of 12 children that there are many opportunities to differentiate"... "It's a big help to teach together with other teachers because you see how your colleagues work and learn from that, you really see DI in practice." (Beginning teacher, Case A)*

Furthermore, the special needs coordinator reported that every class had a 'differentiation table'. This table was a school desk at the end of the

classroom where pupils could sit together with the teacher or special needs coordinator who explained the lesson again.

Cultural school conditions

Trust among the members of the teaching team strongly differed across the cases. In case A interviewees indicated high levels of trust to share teaching materials, to provide answers to questions of other teachers, and to observe the teaching practice of colleagues. These actions engendered reflective dialogue and deprivatized practice.

> *"Just the fact that you feel openness and that you get the space to ask questions and that people respond to your needs. That is extremely valuable." (Beginning teacher, Case A)*

Furthermore, the principal and special needs coordinator relied on the level of trust within the team.

> *"The collaboration in the class groups that is self-evident, something organic. But when things become big, I feel it. Then they come to me to ask help, especially when they face problems at child level." (Special needs coordinator, Case A)*

The principal and special needs coordinator of case B stated that they had put a lot of effort to increase the level of trust within the team. According to the special needs coordinator there was no 'togetherness' ten years ago and teachers worked in isolation. Now there was openness to sit together and discuss issues. Still, the teaching team experienced the idea to open the classroom doors and to observe each other as a threat. Besides the lack of trust to observe each other's classroom practice interviewees in case C indicated that teachers (especially those of grade 4 to 6) did not take initiative to exchange teaching materials and to talk about educational issues.

> *"It's a pity, because there is a lot of time loss. If they would listen to the teachers of the lower grades how they worked with the kids that have learning difficulties they wouldn't need to invent the wheel again." (Principal, Case C)*

Moreover, the principal and special needs coordinator expressed that it is difficult to increase the level of trust within the team.

> *"I think it's really hard to get a grip on it. I know the principal is trying to do something but it is not easy because it has grown for many years and it always goes with ups and downs." (Special needs coordinator, Case C)*

Major differences existed among the three cases in the way directions were set related to DI and how *the DI vision of the school was created*. In case A both the special needs coordinator and principal functioned as strong transformational leaders who stimulated DI implementation. Additionally, the principal indicated that the special needs coordinator was a content expert in terms of DI. As such, the special needs coordinator also provided instructional leadership. Moreover, the data revealed that several experienced teachers were involved in developing a clear DI vision and setting the same goals related to DI. Noteworthy, the DI vision showed concrete links with the general vision of the school and was aligned with the school's vision on evaluation. This school also attached great importance to maintain the DI vision. As such, the principal emphasized that the school was highly committed to the use of DI in the classroom when beginning teachers started working in the school. Furthermore, the entire team was actively involved in the continued development of the DI vision and this was discussed regularly during formal meetings. This case clearly showed that the development of a school vision started at the level of the leaders, but that also teachers had been involved in the process of creating and maintaining the DI vision in the school. Due to the teachers' involvement, there was a lively DI vision known and supported by all teachers. It turned out that the initiatives of case A to create and maintain a DI vision enhanced the sense of collective responsibility among the team.

In case B, the principal was the central figure for the DI implementation but he regularly discussed with the other members of the school policy staff how to make this implementation possible. During the interview, the principal indicated that the special needs coordinator was appointed based on acquired expertise. The special needs coordinator emphasized that the school was engaged with DI for years. Remarkably, no clear DI vision was known by the teaching team. A possible explanation for this inconsistency was that teachers were neglected as active participants in building a DI vision. Initiatives such as providing feedback on how teachers can better integrate DI in the classroom were used to tailor teachers' classroom practice to the DI vision developed by the principal and school policy staff.

In contrast to case A and B, the development of a school vision was formally limited to the principal in case C. According to the principal, the previous school leader installed an outdated system of DI by dividing one grade in one class with strong pupils and one class with weak pupils. When he started as a principal he wanted to turn the ship around and stated "Things had to change". Furthermore, he did not indicate the special needs coordinator as a DI expert. Also, teachers were neglected as active participants and the interviewed teachers gave different versions of what they perceived as the school vision related to DI. This might explain why the principal referred to this period as a process of pulling and dragging. By ignoring the involvement of the teaching team in case B and C, a sense of unity in the DI vision was lacking. This impeded the sense of collective responsibility.

Important differences appeared in *teacher leadership*. In case A it was clear that the special needs coordinator tried to create a sense of ownership for all teachers. She brought questions or concerns of individual teachers related to DI on the team's agenda to allow input of other teachers. In this way the special needs coordinator had a key role in maintaining the DI vision. Additionally, we found that the teachers felt at ease to ask questions at the special needs coordinator and that she searched together with the teachers how they could apply DI in the classroom. Thirdly, the special needs coordinator was

identified as a DI expert and a source of information when it came to applying DI in the classroom.

> *"I mainly seek advice from the special needs coordinator if I have questions related to DI." (Beginning teacher, Case A)*

The special needs coordinator of case B was also identified as a DI expert and was a source of information related to DI. Furthermore, the special needs coordinator stated that she had close relationships with all teachers.

> *"I can collaborate with every member of the team, I know everybody very well and know how to interact with them. They feel that they can fall back on me when they are stuck. It's not a problem to make mistakes." (Special needs coordinator, Case B)*

However, she did not involve teachers in creating the vision on DI. Lastly, the special needs coordinator of case C did not encourage participative leadership and did not close relationships with individual teachers. Consequently, beginning teachers and the principal did not identify the special needs coordinator as an important individual in the process of creating a DI vision. Furthermore, the special needs coordinator and more in general the team of special needs teachers were not regarded as a source of information when it came to DI.

> *"Last year they [teachers of grade 4 to 6] look down on me because I normally work as a kindergarten teacher but during my pregnancy I was assigned as a special needs teacher in primary education and for them that's impossible." (Beginning teacher, Case C)*

Principal leadership

School leaders in the three cases exerted a different kind of *leadership*. The data revealed that the principal of case A played an important role in the

development of the structural and cultural school conditions. The principal invested in a formalized structure for collaboration and made organizational decisions to facilitate DI implementation. Furthermore, he had an initiating role in the development of an explicit vision related to DI. This initiating role was combined with a strong engagement of the special needs coordinator and experienced teachers to set the same goals related to DI. In addition, the principal delegated leadership responsibilities and identified the special needs coordinator as a DI expert. Furthermore, high levels of trust and organic forms of collaboration were visible in this school.

The principal's leadership of case B was characterized by offering a formalized structure to collaborate and to guide the process of trust building among the members of the school team. Furthermore, the principal functioned as the central figure for the DI implementation and strongly monitored how teachers implemented DI in the classrooms. Although the school policy staff was involved in the DI implementation process, and the principal assigned a teacher leadership role to the special needs coordinator, teachers were not engaged in building the DI vision. Consequently, we can conclude that the main focus of principal B was on the implementation of structural school conditions. He only moderately facilitated the cultural conditions.

Lastly, principal C did not facilitated the structural nor the cultural school conditions. First, the formalized structures available for the team to communicate with one another are limited. Also, there is a lack of organizational decisions to facilitate DI implementation. Additionally, the development of a school vision related to DI was formally limited to the principal and he did not delegated responsibilities related to DI implementation.

Discussion and conclusion

The starting point of the present study was the different level of beginning teachers' DI learning in schools. Based on these differences, we aimed to examine PLC development within three different schools. Interviews with the principals, beginning teachers, and special needs coordinators

revealed that the schools' stages of operating as PLCs differed between schools. This is in line with the studies by Grossman, Wineburg, and Woolworth (2001) and Louis and Kruse (1995) who identified three stages of PLC development that largely differ in their collaboration and professional learning, namely the 'beginning' (case C), 'evolving' (case B), and 'mature' (case A) stage.

We can situate case C in the 'beginning stage'. Firstly, teachers in this school talked most of the time about practical matters such as schedule lesson planning. Secondly, the members of the school team identified themselves with subgroups within a larger group and a sense of individualism was more present than group responsibility. This confirmed that teachers in this type of PLC work in relative isolation and collaborate on a superficial level (Maloney & Konza, 2011). Finally, Grossman et al. (2001) found that schools in the beginning stage of PLC development see a teacher's intellectual growth as an individual responsibility. The limited development of the PLC characteristics in case C is a clear indication why beginning teachers in case C did not feel supported in their DI learning.

Case B can be allocated to the 'evolving stage'. Firstly, teachers discussed both practical issues and pedagogical didactics. Secondly, the special needs coordinator was involved in providing DI forms to beginning teachers. As such, schools in the evolving stage recognize that members of the teaching team can be resources for each other's learning and teaching practice and are therefore aware of the fact that teacher's intellectual growth is not an individual responsibility. Lastly, our findings indicated that schools in the evolving stage feel the need to create an educational environment focused on student learning and academic success. As such, these schools acknowledge the value of collective responsibility and try to create this within the teaching team (Louis & Kruse, 1995). The evolving PLC, established in case B, is reflected in the perceptions of the beginning teachers who indicated that other teachers within the PLC to a certain extent help them to professionalize in DI.

Case A can be assigned to the 'mature stage'. First, in addition to the abovementioned forms of reflective dialogue all members of the team

participated in discussing issues related to DI which is in line with the study of Louis and Kruse (1995). During these in-depth conversations all members were supported when facing DI related challenges suggesting that teachers were highly committed to their colleagues' growth. Second, our results showed that there was a strong sense of collective responsibility and respondents saw this as a matter of course. Also, Hipp and Huffman (2003) found that schools in the mature stage experience the commitment to student and teacher learning as evident. Based on these results and the statement of the beginning teachers that diverse actions within the school team foster their professional learning in DI, we can conclude that case A is the school with the strongest learning environment for beginning teachers. As such, we can identify this school as what McLaughlin and Talbert (2001) call a 'teacher learning PLC'.

The third PLC characteristic, deprivatized practice, did not occur frequently in all schools considered for this study. This is in line with the findings presented in the TALIS report which indicated that Flemish teachers rarely open their classroom doors and provide feedback to one another (OECD, 2014).

When we look at the structural school conditions, we found that more organizational structures were installed to stimulate PLC development and DI implementation in case A than in case B and C. Following Sleegers et al. (2013) and Owen (2014) we expected that creating scheduled planning time for teachers to meet and talk would stimulate PLC development. We saw that collaboration was centered around individual initiatives in case C. In case B mainly formal meetings took place whereas in case A formal meetings were alternated with individual initiatives to collaborate. Our results showed that formal initiatives had implications for the level of reflective dialogue.

Case A is the only case who systematically installed organizational structures to facilitate DI implementation. Furthermore, case A installed a differentiation table and multigrade teaching. This last initiative facilitated deprivatized practice, which in turn, fostered beginning teachers' professional learning in DI.

Our results also revealed that cultural school conditions play an essential role in increasing the social capacity of schools and developing PLCs. First, we saw that a high level of trust, such as in case A, engenders reflective dialogue and fosters deprivatized practice which confirms research of Stoll et al. (2006) and Atteberry and Bryk (2011). In contrast, low levels of trust, like in case C, impede the development of a PLC.

Second, the process of creating a DI vision varied among the three cases. In the literature, the importance of a powerful guiding coalition that grows over time is identified as a key element for a successful transformation or implementation (Kotter, 2007). In addition, Kotter (2007) declared that in the most successful cases of implementation the members of the coalition have a lot of expertise and information and are powerful in terms of relationships. Also, he stated that it is crucial that members who have no leadership position are included in the coalition. In case A the members of this coalition were the principal and the special needs coordinator but also experienced teachers were involved in creating a clear DI vision. Case B had a coalition that existed out of the principal and the school policy staff. In both cases A and B the special needs coordinator was assigned to this position based on DI expertise. However, only in case A experienced teachers were also part of the guiding coalition. As the experienced teachers of case B also might be essential if it comes to expertise and information the coalition of case B is less effective than the coalition of case A. Lastly, in case C only the principal was identified as an active supporter of creating a DI vision and the special needs coordinator was not indicated as a DI expert nor as a member of the guiding coalition. This might explain why the use of DI was not fluently integrated in the school and colleague teachers did not help beginning teachers to apply DI in the classroom.

Our results indicated that only in case A we could identify initiatives to develop and maintain the DI vision. The fact that the vision on DI showed concrete links with the vision on student evaluation could be identified as the main reason why the school succeeded in developing a solid DI vision. Also, the principal took time to make sure that novice teachers were aware of the

importance of DI in the school which confirms the findings of previous studies (Holloway, 2000; Kotter, 2007). Furthermore, our findings showed evidence that when all teachers participated in the development of the school's vision on DI, a stronger sense of collective responsibility toward students was developed (e.g. Senge, 2006). We can suggest that an increased level of collective responsibility stimulates teachers to have more in-depth discussions during their collegial reflective dialogue. In turn, beginning teachers are stimulated to professionalize in DI and adapt their teaching practice to the feedback of their colleague-teachers. We could not identify a solid DI vision for case B and C. However, teachers of case B get tailored feedback of the principal and special needs coordinator with regard to DI which is not present in case C.

Furthermore, we noticed that not all special needs coordinators were indicated as strong teacher leaders. How principals selected their special needs coordinators and which position they gave them in the school in general and more specifically in the realization of DI implementation determined if special needs coordinators turned into effective teacher leaders and fostered the effect of the cultural school conditions. Principals of case A and B clearly indicated that the special needs coordinator had an expert role in supporting beginning teachers' DI learning. In contrast, a person without DI expertise was appointed as a special needs coordinator in case C. Consequently, members of the teaching team did not view this person as competent in supporting them in their DI professionalization. Moreover, only the special needs coordinator of case A tried to create a sense of ownership toward DI within the teaching team and consequently played a role in maintaining the DI vision.

Finally, our results showed that the principal's leadership styles to elaborate structural and cultural school conditions differed strongly. The principal of case C scored low on the structural and cultural dimension of leadership whereas the principal of case B scored high on the structural aspects but moderately on the cultural aspects. The leadership of principal A scored high on both the structural and cultural dimension. As stated by Creemers (2002) both structural and cultural school conditions need to be present within

a school in order to make educational change happen. In line with Leithwood et al. (2004) our results indicated that principals contribute to school improvement and educational change in an indirect way by shaping the nature of structural and cultural school conditions that develop a PLC. More specifically, principal A invested in elaborating both structural and cultural school conditions. In addition, this principal shared leadership functions with the special needs coordinator. As such, not only the leadership of the principal but also the leadership of the special needs coordinator strengthen the cultural school conditions. In turn, well-developed structural and cultural school conditions foster the development of a PLC. Therefore, we can identify case A as a mature PLC and as the strongest learning environment for beginning teachers among the three cases. In contrast, fewer initiatives can be identified for principal C in order to realize good structural and cultural school conditions. Also, the special needs coordinator has no leadership function. These aspects impeded school C to evolve toward a mature PLC and resulted in a poor learning environment for beginning teachers.

Several limitations should be acknowledged. A first limitation consists of our small sample size. We offer an insight in the context of only three primary schools that were selected as prototypical cases. In this regard, we should be careful about our findings and we do not claim generalizability of our findings. As such, further research may need to consider a larger number of schools, spread over different educational levels. Second, we strongly focused on the environmental factors and the collaborative aspect within schools that might influence beginning teachers' learning in DI. The perspective that beginning teachers first need to master basic skills before they can develop complex teaching skills is not applied in this study. Therefore, further research need to study DI learning of beginning teachers from this perspective and combine it with the results of this study to get a complete picture of beginning teachers' learning in DI. Likewise, governmental decisions may need to be considered in future studies. Picturing, how schools change their school policy and teaching practice in response to the approved M-decree might reveal crucial information

to understand DI learning of beginning teachers. Third, our research was limited in time. It would be interesting to follow if schools in the mature stage of PLC development remain to function at this high level and if schools in the beginning stage evolve to other stages over time.

Although this study is exploratory and descriptive in nature, findings of this study may provide useful suggestions for practitioners and policymakers. First, our findings highlight that in our three cases PLC characteristics were important for the professional learning in DI of beginning teachers. Therefore, we believe it is essential that schools consider to stimulate beginning teachers to have in-depth conversations with colleague-teachers on how to use DI in the classroom. Also, the conditions that strengthen a joint sense of responsibility among teachers to meet the diverse needs of students is a relevant issue to consider. Second, we found that the special needs coordinator in our cases played an important role in the implementation of DI and in the development of the PLC characteristics. Therefore, it is recommendable that school leaders thoughtfully decide who can fill in the position as a special needs coordinator. As such, principal trainings can consider if they provide sufficient support to develop the necessary skills of the school leaders in selecting and coaching teacher leaders, such as special needs coordinators, to support teachers and to manage school improvement. Third, an essential part of teachers' professionalization depends on the school learning environment. Hence, policy makers need to be aware that PLCs can play a key role in teachers' professional learning and may consider to include collegial dialogue as a formal part of teachers' job description as well as to stimulate schools to program scheduled planning time. Also, programs to train effective teacher leaders can contribute to support powerful PLCs. The combination of the right school conditions and the development of principal and teacher leader expertise can lead to stronger professional learning processes of beginning teachers in DI.

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Chapter 5

How green is the grass on the other side? Exploring the intention of beginning teachers to leave the teaching profession[1]

Abstract

The high turnover rates of beginning teachers are an issue of continuing concern in education. However, little is known about the psychological mechanisms that play a role in the intention to leave the teaching profession. This study recruited 272 beginning teachers from 72 primary schools to investigate whether job insecurity, job resources (i.e. teacher autonomy, collective responsibility, reflective dialogue, and deprivatized practice), and teachers' psychological states (i.e. teacher self-efficacy and affective commitment) decreased turnover intentions (see Figure 1). Path analysis revealed that teacher self-efficacy, affective commitment, and the control variable 'gender' directly reduced the intention to leave the job. Interestingly, the relationship between teacher autonomy and collective responsibility on the one hand and turnover intentions on the other hand is fully mediated by teacher self-efficacy and affective commitment. These findings provide insight into the motivational processes of beginning teachers to leave education and identify potential mitigating factors that lower their turnover intentions.

[1] Based on De Neve, D., & Devos, G. (submitted). How green is the grass on the other side? Exploring the intention of beginning teachers to leave the teaching profession. *European Journal of Teacher Education*.

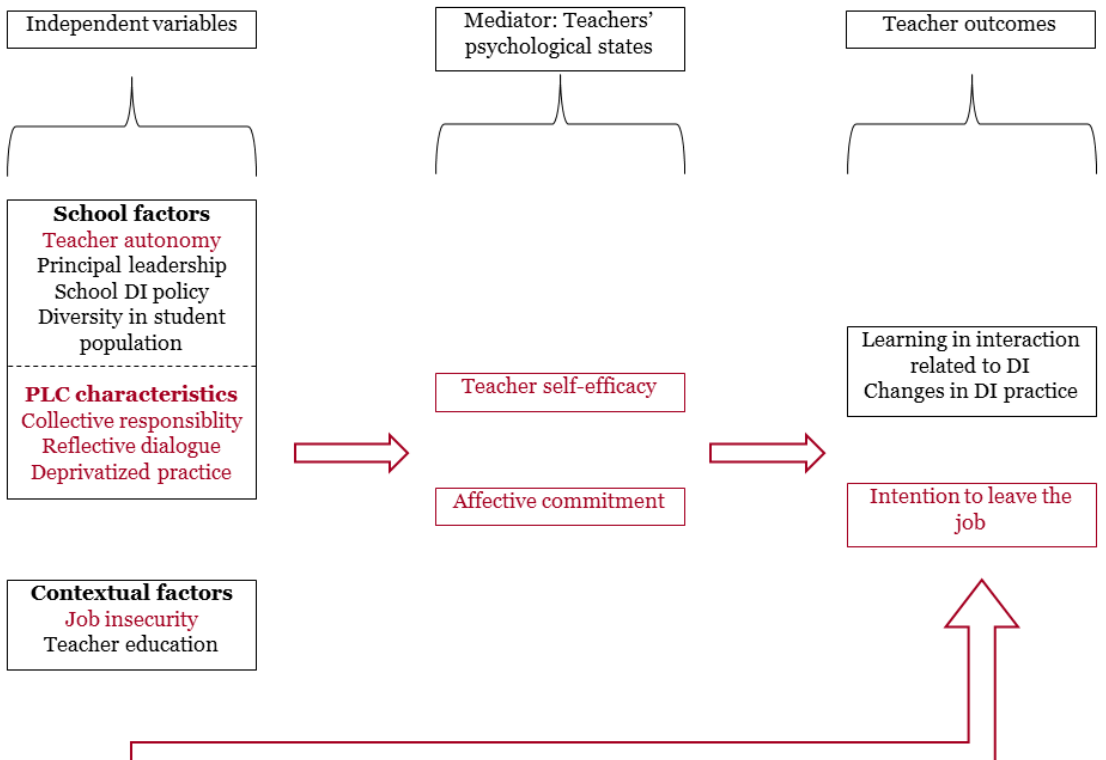

Figure 1. Chapter 5 situated in the guiding framework of this dissertation

Introduction

Teacher turnover, although high for the entire teaching profession, especially affects beginning teachers (Grissmer & Kirby, 1997). In countries such as the United States, 25 percent of the beginning teachers quit teaching before their third year, and almost 50 percent leave the profession within the first five years (Chang, 2009; Ingersoll, 2001; Ingersoll & Smith, 2003; Johnson & Birkeland, 2003). In Flanders (Belgium) the Flemish Department of Education and Training (2013) indicated that 13 percent of all primary school teachers younger than 30 and 22 percent of all secondary school teachers younger than 30 leave the profession within the first five years. In this study, we will focus on the intention of beginning primary school teachers to leave the teaching profession.

The existing research shows that teacher turnover negatively affects student achievement and has important psychological consequences for both the individuals and their organizations (Macdonald, 1999; Ronfelt, Loeb, & Wyckoff, 2013). Therefore, it is essential to understand which factors affect the high turnover rates of beginning teachers. This study aims to address this issue by focusing on determinants that could be important in beginning teachers' intention to leave the job.

Research indicates that beginning teachers are exposed to a high work pressure when they start teaching in a particular school (e.g. Goddard and O'Brien, 2003). More specifically, educational studies have revealed that job insecurity is one of the most important contextual aspects that increase the work pressure of beginning teachers (Chang, 2009; Johnson & Birkeland, 2003). Although teachers in general are perceived to be more steadily employed than employees in the private sector (Ruvio & Rosenblatt, 1999), beginning teachers face a lot of job insecurity when they start their career (Devos & Vanderheyden, 2002; OECD, 2005). Moreover, it can take several years before new teachers get tenured (Flemish Department of Education and Training, 2013). These insecurities make it likely for new teachers to quit teaching.

However, how job insecurity affects beginning teachers' turnover intentions remains underexplored.

An important question here is how schools can mitigate the intention of beginning teachers to leave the teaching profession. Scholars argue that schools that provide their teachers the necessary collegial support and autonomy, succeed better in retaining teachers in the profession. According to Johnson (2006) schools must become a place that stimulates collaboration and therefore invest in collegial support to retain new teachers of high quality. Also, Pomaki, DeLongis, Frey, Short, and Woehrle (2010) indicated that new teachers' level of perceived collegial support increase their intention to stay in the teaching profession. In the literature, studies have found that strong professional learning communities (PLCs), which provide collegial support, reduce teachers' intention to leave the profession (Allensworth, Ponisciak, & Mazzeo, 2009; Johnson & Birkeland, 2003). Hence, we take characteristics of PLCs into account as potential mitigating school factors for beginning teachers' intention to leave education. Furthermore, considerable research has addressed that teachers value the autonomy they have to teach their own group of students and that this autonomy decreases teacher turnover (e.g. Ingersoll and May, 2010). Consequently, teacher autonomy is considered as a supportive school factor in this study.

The Job Demands-Resources (JD-R) model of Bakker and Demerouti (2007) provides a theoretical framework for the importance of factors such as collegial support and work autonomy. These supportive factors are considered as job resources. These resources are not only functional in achieving work-related goals and stimulating personal growth, they also evoke underlying psychological processes. One of these psychological processes is motivational in nature whereby it is assumed that the availability of job resources reduces high work pressure, fosters the feelings of accomplishment and success and enhances affective commitment (Bakker & Demerouti, 2007). Recently, evidence is provided to extend the JD-R model with the mediating role of self-efficacy (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007). Support from

colleagues and autonomy can give people more confidence in themselves and increase their feeling that they are better able to attain their goals. This in turn leads to more feelings of success and decreases their intention to leave the job. Furthermore, research showed that affective commitment acted as a mediator between job resources, job insecurity and turnover intentions (Bakker, Demerouti, & Schaufeli, 2003; Staufenbiel & Konig, 2010). In this study, both self-efficacy and affective commitment are identified as psychological states which represent the personal goals and/or beliefs about one's capacities and one's context (Geijsel, Sleegers, Leithwood, & Jantzi, 2003; Geijsel, Sleegers, Stoel, & Krüger, 2009).

Until now, researchers have examined the mediating effects of the psychological states 'self-efficacy' and 'affective commitment' separately from one another (e.g. Bakker et al., 2003; Xanthopoulou et al., 2007). However, research that considers the buffering potential of job resources toward job insecurity, in combination with the mediating effects of both self-efficacy and affective commitment on beginning teachers' turnover intentions is missing. A deeper understanding of these processes is crucial to get insight in the steps that lead to teachers' intention to leave the job.

Theoretical framework

The theoretical framework we put forward in this study is presented in Figure 2. The main purpose of this study is to identify important factors that decrease beginning teachers' intention to leave the job. In this regard, we put forward several variables that may play a role in the turnover intentions of beginning teachers. First, job insecurity is taken into account as a contextual factor. Second, job resources (i.e. teacher autonomy, collective responsibility, reflective dialogue, and deprivatized practice) considered as important school factors, are theorized to have an influence. Third, teachers' psychological states (i.e. teacher self-efficacy and affective commitment) are identified as mediating variables between job insecurity, job resources and beginning teachers' intention to leave education. In the following paragraphs, we will explain more profoundly the importance of each variable in the theoretical framework.

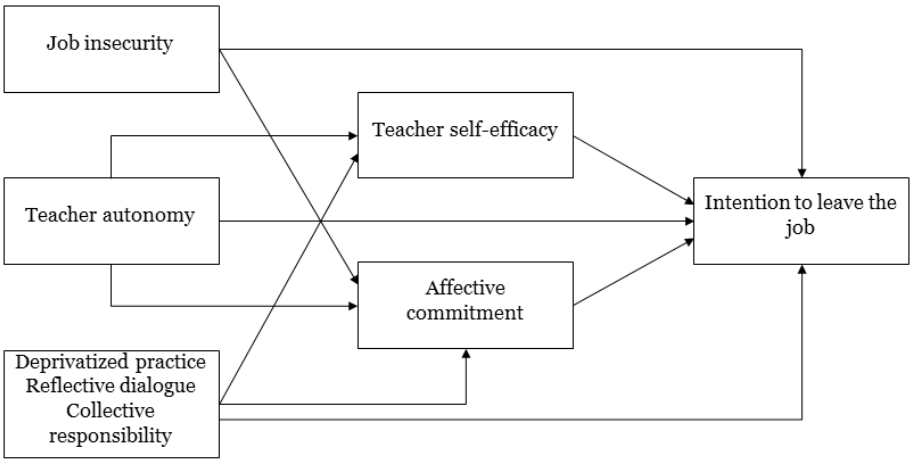

Figure 2. Theoretical model.

Intention to leave the job

Turnover intentions have been consistently indicated to be the strongest predictor of actual turnover (Pomaki et al., 2010; T. W. Lee and Mowday, 1987). As we focus in this study on how we can keep beginning teachers in the teaching profession it is crucial that we get insight in how a shift in beginning teachers' ideas to stay in the profession can be realized. Therefore, the present study is concerned with the intention of beginning teachers to leave the profession. The intention of beginning teachers to migrate to another school is beyond the scope of our study. We define intention to leave the job as the subjective estimation of an individual regarding the possibility to leave the profession in the near future (Mobley, 1982).

Job insecurity

In line with the literature, we characterize job insecurity as a) an employee's subjective experience of the actual work environment, b) an involuntary phenomenon, c) a primarily concern about the insecurity for future employment or the threat of losing the current job, and d) something that,

although it may change over time, is found to be a rather enduring experience (Greenhalgh & Rosenblatt, 1984; Sverke, Hellgren, & Naswall, 2002).

In their meta-analytic review obtained from 133 studies Cheng and Chan (2008) pointed out that job insecurity is positively related to turnover intentions which replicate the meta-analytic findings of Sverke et al. (2002). In addition, Cheng and Chan (2008) found that this relationship was stronger for younger employees than for older employees. Furthermore, the results of a study by Ruvio and Rosenblatt (1999) indicated that schoolteachers who experienced job insecurity exhibited an increased tendency to quit teaching. Moreover, the results of a study with newly qualified teachers who dropped out after five years demonstrated that a lack of future prospects, which can be linked to job insecurity, was the predominant motive to leave the profession (Struyven & Vanthournout, 2014). Although there are studies within the educational context which provide us insights in the consequences of job insecurity for teachers (e.g. Ruvio and Rosenblatt, 1999), few studies explore the relationship of beginning teachers' job insecurity and intention to leave the job. In line with prior research, we hypothesize that: *'The job insecurity of beginning teachers will be positively related to their intention to leave the job'* (hypothesis 1).

Job resources

As previously mentioned, job autonomy and collegial support are identified as essential job resources within the JD-R model (Bakker & Demerouti, 2007). Previous studies have shown that job autonomy and support from colleagues are negatively associated with the intention to leave the profession (Johnson & Birkeland, 2003; Kim & Kao, 2014; Pomaki et al., 2010). However, research that examines the relationship between teacher autonomy and beginning teachers' intention to leave the job is lacking. Furthermore, few studies explored how PLC characteristics, as indicators of collegial support, are related to beginning teachers' intention to leave the profession.

Teacher autonomy

Several studies have shown that teacher autonomy, defined as teachers' feelings of personal control and the control they have on their work environment, is a strong factor in reducing teachers' intention to leave the profession (Pearson & Hall, 1993). In particular, teacher autonomy refers to the freedom teachers get to determine task-related characteristics such as choosing student goals, scheduling the use of time in the classroom, and selecting teaching methods and forms of assessment (Fireston & Pennell, 1993; Pearson & Moomaw, 2006).

A study by Ingersoll and May (2010) revealed that, for mathematics teachers, one of the strongest factors to decrease turnover levels is the degree of teachers' individual classroom autonomy. Furthermore, Johnson (2006) stated that teachers are more likely to stay in the teaching profession when they perceive higher levels of autonomy. In this regard, we propose that: *'Teacher autonomy will be associated with reduced levels of intention to leave the job'* (hypothesis 2).

Characteristics of professional learning communities

As mentioned above, research showed that teacher autonomy decreases the intention to leave the job. However, schools of the 21th century become more complex and evidence is given that teachers today place more value on the opportunity to work together with their colleagues (Johnson, 2006). In particular, research pointed out that teachers appear to be more likely to leave the teaching profession if they experience a lack of collegial support (e.g. Darling-Hammond, 2003; Guarino, Santibañez, and Daley, 2006; Ingersoll and Smith, 2003). A study with beginning teachers found evidence for a direct negative relationship between social support from colleagues and the intention to quit teaching (Pomaki et al., 2010). Furthermore, the findings of a longitudinal interview study with 50 beginning teachers who stayed in their schools, moved to new schools, or leaved the teaching profession within the first 3 years of teaching revealed that for both leavers and movers one of the main reasons to leave the school or teaching profession was the lack of collegial

support. Moreover, stayers reported that their schools arranged schedules that accommodated team planning and offered opportunities for collegial interaction. In addition, the schools of the stayers were organized in this way that they engaged teachers of all experience levels in collegial and collaborative efforts and that the entire teaching team took responsibility for developing strength and coherence throughout the school (Johnson & Birkeland, 2003). Schools that offer opportunities for teachers to collaborate, share ideas, and critically question its teaching practice in an ongoing, reflective, and inclusive way focusing on teacher and student learning are identified as professional learning communities (PLCs) (Stoll, Bolam, McMahon, Wallace, & Thomas, 2006). In the last three decades, scholars gave more attention to the PLC concept. Its conceptualization started in the 1980s and was measured by using one subdimension. After the 1990s, the multidimensional perspective became dominant. This resulted in the introduction of many different PLC characteristics as key variables. In her review which included more than 60 articles on the measurement development of the PLC concept Lomos (2012) identified the Teacher's Professional Community index of Wahlstrom and Louis (2008) as the instrument that best met her analysis criteria. These criteria were related to the strength of the theoretical and empirical base, the reliability and validity of the subscales, and the recent character and the multidimensional perspective of the instrument. The Teacher's Professional Community index includes four characteristics: 'deprivatized practice', 'reflective dialogue', 'collective responsibility', and 'shared values and vision'. Lomos (2012) attempted to validate the Teacher's Professional Community index in the Dutch educational context and retained a three-factor structure including deprivatized practice, reflective dialogue, and collective responsibility. In previous research, on grounds of demonstrated exploratory (EFA) and confirmatory factor analysis (CFA), we also found the three characteristics Lomos retained in her validity study (De Neve, Devos, & Tuytens, 2015).

Reflective dialogue

To generate reflective dialogue it is essential that teachers are self-conscious of their personal work. Only then teachers can have in-depth conversations with their colleagues about educational issues such as instruction and student learning. These in-depth conversations can lead to new ideas and can merge with the pre-existing knowledge of teachers. In turn, this results in a deeper understanding of the didactics and can induce changes in beliefs and teaching practice (Newmann, Marks, Louis, Kruse, & Gamoran, 1996; Newmann & Wehlage, 1995; Stoll et al., 2006).

Deprivatized practice

This characteristic entails that teachers define and develop their practice openly, observe each other, and offer feedback in order to improve pedagogy. Strategies that give shape to this characteristic in practice are reciprocal peer coaching and joint planning (Kruse, Louis, & Bryk, 1995; Wahlstrom & Louis, 2008).

Collective responsibility

Teachers within a PLC attempt to create a joint sense of responsibility toward student learning. To realize this characteristic teachers discuss different manners of instruction in order to stimulate students' academic growth (Louis, Marks, & Kruse, 1996; Stoll et al., 2006; Wahlstrom & Louis, 2008).

Some studies examined the relationship between the PLC characteristics and turnover intentions. A study that used first-year teachers' reports of working conditions to assess the effect of working conditions on turnover behavior found that teachers perceptions concerning collective responsibility are associated to both their decisions to transfer to another school and to leave teaching (D. Boyd et al., 2011). In addition, Pogodzinski, Youngs, and Frank (2013) found that when beginning teachers perceived higher degrees of collective responsibility among teachers the more likely they will remain teaching in their school. However, little research explicitly explores the relationship between the abovementioned PLC characteristics and teachers' intention to leave the job in one study. As few studies examined the differential

influence of the PLC characteristics on teachers' intention to leave the job, this study is exploratory in nature and we cannot make statements about which characteristic has a stronger influence on turnover intentions. Consequently, we formulate one hypothesis which predicts that: *'There will be a negative relationship between the PLC characteristics and beginning teachers' intention to leave the job'* (hypothesis 3).

Teacher self-efficacy

Self-efficacy is grounded in the social cognitive theory (SCT) that represents a model of triadic reciprocal causation. In this interactional and dynamic structure, the SCT accords a central role to personal factors in the form of cognitive, affective, and biological events, environmental factors, and behavior. As such, it tries to explain and predict how people acquire and maintain certain behavioral patterns (Bandura, 1977). Self-efficacy refers to people's beliefs about their ability to achieve desired outcomes. From this perspective, such efficacy beliefs determine how environmental opportunities are perceived, which activities people will select, how much effort is spend on an activity, and how strong people persist when confronted with obstacles (Bandura, 1997). Previous studies have indicated that teachers with low levels of self-efficacy are more likely to have higher intentions to leave the job (e.g. Hoigaard, Giske, and Sundsli, 2012; Swanson, 2010). More specifically, Wang, Hall, and Rahimi (2015) demonstrated that teachers' self-efficacy regarding student engagement and instructional strategies significantly predict the intention of teachers to leave the profession. Furthermore, two qualitative studies based on interviews with stayers and leavers have shown that beginning teachers' decisions to remain in or leave teaching was primarily based on whether they could be effective with their students. In particular, leavers identified a lack of efficacy beliefs in managing the classroom and handling misbehaving students as a reason why they leave education (Hong, 2012; Johnson & Birkeland, 2003). Based on these findings, we predict the following: *'The higher beginning teachers' self-efficacy, the lower their intention to leave the job'* (hypothesis 4).

The mediating role of teacher self-efficacy

As previously stated, self-efficacy does not stand on its own. The SCT assigned a mediating role to self-efficacy. As such, relationships between environmental contexts such as the school context and how people feel, think, and act may be mediated by self-efficacy (Bandura, 1997). Furthermore, research confirmed the mediating position of self-efficacy that contributes to the explanation of the motivational process within the JD-R model. In particular, Avey, Luthans, and Jensen (2009) suggested that self-efficacy can play a key role in understanding the variation in perceived symptoms of stress and intentions to quit. Moreover, Demerouti and Bakker (2011) stated that future research needs to examine the complex interaction between job demands such as work overload, job resources, and self-efficacy in relation to outcomes such as intention to leave the job.

Teacher autonomy

Ryan and Deci (2000) have pointed out that work autonomy has an enhancing effect on employees' self-efficacy because it enables a person to select tasks that fit their skills and interests. Furthermore, V. E. Lee, Dedick, and Smith (1991) found that a supportive environment and sufficient classroom autonomy enhanced teachers' self-efficacy. Similarly, Skaalvik and Skaalvik (2014) suggested that autonomy works positively on mastery expectations of teachers. Teacher self-efficacy, in turn, reduces employees' intention to leave the profession. Nonetheless, if teachers do not believe in their ability to teach, it is plausible that turnover intentions are higher. Furthermore, the relationship between work autonomy and self-efficacy is included in tests of the JD-R model (Bakker & Demerouti, 2007). In their study based on employees' daily reports Xanthopoulou, Bakker, Demerouti, and Schaufeli (2009) demonstrated that self-efficacy functions as a process variable in the relationship between work autonomy and work engagement.

PLC characteristics

Teachers' self-efficacy may also have a mediating role for the relationship between PLC characteristics and intention to leave the job. According to the motivational process of both the SCT (Bandura, 1977) and the JD-R model (Xanthopoulou et al., 2007) support from colleagues is related to organizational outcomes through its relation with self-efficacy. In particular, the study of Kennedy and Smith (2013) supported the positive relationship between collective reflective dialogue and teacher self-efficacy. Furthermore, Lakshmanan, Heath, Perlmutter, and Elder (2011) revealed that enhanced teacher efficacy is a meaningful benefit gained from participation in PLCs. They emphasized that when the work context provides chances to improve content knowledge and offers teachers collaborative opportunities, growth in teacher efficacy can be established. Enhanced levels of teachers' efficacy may in turn have a negative effect on teachers' intention to leave the profession. In addition, teachers reported that achieving success in their teaching depended largely on the support from colleagues. Those teachers who reported more experiences of success were in turn more likely to stay in the profession (Johnson & Birkeland, 2003). As previously stated, recent studies in the JD-R framework found that self-efficacy mediates the relationship between job resources including work autonomy and collegial support, and work engagement (Mastenbroek, Jaarsma, Scherpbier, van Beukelen, & Demerouti, 2012; Vink, Ouweneel, & Le Blanc, 2011). However, research in the educational field that examines the relationship between job resources and the intention to leave the profession via its relationship with teacher self-efficacy is lacking. This leads us to the following hypothesis: *'The relationship between (a) teacher autonomy, (b) PLC characteristics and teachers' intention to leave the job will be partially mediated by teachers' self-efficacy'* (hypothesis 6).

Affective commitment

The motivational process of the JD-R model proposed that job resources lead to high levels of affective commitment which, in turn, is negatively related to turnover intentions (Bakker, Demerouti, & Schaufeli,

2003). According to Meyer, Stanley, Herscovitch, and Topolnytsky (2002) affective commitment is one of the three forms of organizational commitment that refers to the emotional attachment and involvement to the organization. Their meta-analyses demonstrated that all forms of commitment were negatively associated to turnover intentions but affective commitment had the strongest correlation with turnover intentions. Consistent with the findings of Meyer et al. (2002) studies found that when teachers are emotionally attached to an organization they will exhibit lower turnover intentions (e.g. Billingsley, 2004). Therefore, we put forward the next hypothesis: *'Beginning teachers' affective commitment will be negatively associated to their intention to leave the job'* (hypothesis 6).

The mediating role of affective commitment

Job insecurity

A growing body of research links the concepts job insecurity, affective commitment, and turnover intentions to one another. Previous meta-analyses documented that employees who perceive high levels of job insecurity distance themselves from the job and the organization (Cheng & Chan, 2008; Sverke et al., 2002). Furthermore, a study by van Zyl, van Eeden, and Rothmann (2013) indicated that job insecurity was associated with detachment from the organization and low identification with the organization. Employees with low levels of affective commitment are in turn less likely to exert effort on behalf of the organization. An organization may suffer from this negative emotional link through increased turnover (Camilleri, 2002; Meyer & Maltin, 2010). In addition, Staufenbiel and Konig (2010) demonstrated in their study that job insecurity led to reduced work attitudes (i.e. job satisfaction and commitment) which in turn led to an increase in turnover intentions. Similarly, Davy, Kinicki, and Scheck (1997) provided strong support for the proposition that job satisfaction and organizational commitment mediate the effects of job security on intentions to quit the job. Lastly, survey data from four European countries showed that the indirect negative effect of job insecurity on turnover intentions

is mediated by organizational commitment and job satisfaction (Chirumbolo & Hellgren, 2003).

Teacher autonomy

Work autonomy has been identified as a contributor to affective organizational commitment (Jernigan, Beggs, & Kohut, 2002). Previous studies that used the JD-R model as theoretical framework indicated that work autonomy had a strong positive relationship with affective, normative, and continuance organizational commitment (Bakker, Demerouti, de Boer, & Schaufeli, 2003; C. M. Boyd et al., 2011; Q. Hu, Schaufeli, & Taris, 2011). Furthermore, a study by Ha, Kim, Hwang, and Lee (2014) revealed that work practices such as work autonomy lead primarily to decreased turnover intentions through its relationship with organizational commitment that consisted of affective, normative, and continuance commitment.

PLC characteristics

Within the JD-R model evidence is found that collegial support is positively related to affective commitment (Q. Hu et al., 2011) and that affective commitment acts as a mediator between job resources such as support from colleagues and turnover intentions (Bakker, Demerouti, & Schaufeli, 2003). More specifically, the study of Feng and Angeline (2010) indicated that the relationship between organizational support and teachers' turnover intentions is mediated by affective commitment. Furthermore, Chan, Lau, Nie, Lim, and Hogan (2008) discussed the facultative role of PLCs in teachers' sense of identification with the school. They found that reflective dialogue is positively related to teachers' sense of identification with the school. However, there has been little empirical investigation of the mediating role of affective commitment in the relationship between beginning teachers' job insecurity and job resources and their intention to leave the teaching profession. This leads us to the last hypothesis: *'Affective commitment will partially mediate the relationship between (a) job insecurity, (b) teacher autonomy, and (c) the PLC characteristics on the one hand and beginning teachers' intention to leave the job on the other hand'* (hypothesis 7).

Method

Procedure and participants

Data were collected in 72 Flemish primary schools (Belgium). The sample was stratified for region and educational network (13 public schools, 18 subsidized municipal schools, and 41 subsidized private schools). According to convenient criteria we defined teachers with minimum three months and maximum five years of experience in the participating schools as beginning teachers (Huberman, 1989). A minimum set of teaching experience was included because beginning teachers need to get time to experience school related influences such as PLC characteristics. In total, 272 beginning teachers completed the questionnaire. This sample consisted of 89.7% female and 10.3% male respondents mirroring the disproportionate percentage of beginning male and female primary school teachers in Flanders. The mean age of the respondents is 27.10 years (SD = 5.05) and the average school experience is 2.33 years (SD = 1.37).

Measures

Job insecurity

To measure job insecurity, we selected 4 items of the Job Insecurity scale of De Witte (2000) (α = .86). An exemplary item is 'I feel insecure about the future of my job'.

Teacher autonomy

Teacher autonomy was measured by 6 items that are selected of the subscale 'general teaching autonomy' of the Teacher Autonomy Scale of Pearson and Moomaw (2006) (α = .64). Example item: 'I am free to be creative in my teaching approach'.

PLC characteristics

Based on the EFA and CFA in previous research (De Neve et al., 2015) we used 11 items of the Teacher's Professional Community index of Wahlstrom and Louis (2008) to measure the PLC characteristics deprivatized practice (3

items), reflective dialogue (5 items), and collective responsibility (3 items). The example items for the scales are respectively: 'How often in this school year have you had colleagues observe your classroom?', 'How often in this school year have you exchanged suggestions for curriculum materials with colleagues?', and 'Teachers in this school take responsibility for improving the school outside their own class.'. These three subscales all showed acceptable internal consistency with a Cronbach's alpha reliability of .70 for deprivatized practice, .68 for reflective dialogue, and .69 for collective responsibility.

Teacher self-efficacy

The teacher self-efficacy scale is based on the short version of the Ohio State teacher efficacy scale (Tschannen-Moran & Hoy, 2001) and consists of 9 items (e.g. 'How much can you do to control disruptive behavior in the classroom?') (α = .78).

Affective commitment

For affective commitment, we used all items (8 items) of the affective commitment scale of Allen and Meyer (1990) (e.g. 'I enjoy discussing my organization with people outside it') (α = .80).

Intention to leave the job

Teachers' intention to leave the job was measured using a scale of Carmeli and Weisberg (2006). The items in this scale were adjusted to measure the intention to leave the teaching profession. The scale consists of 3 items (e.g. 'I think a lot about leaving the teaching profession'). The EFA revealed a one-factor structure. The scale demonstrated good reliability: α = .90.

The items for the variables job insecurity, teacher autonomy, collective responsibility, and affective commitment are scored on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scores of the items for reflective dialogue and deprivatized practice varies from 1 (never) to 5 (very often). Lastly, teachers rated the items for teacher self-efficacy from 1 (not at all) to 5 (very good).

Control variable 'gender'

Previous studies found that men, who comprise the minority of the teaching workforce, are more likely to quit teaching (Addi-Raccah, 2005; Harris & Adams, 2007; Ingersoll, 1997; Struyven & Vanthournout, 2014). As such, we suggest that gender is an important factor in teachers' intention to leave the job and that male teachers are more readily to leave the teaching profession. Gender was included as a categorical variable in this study (women 0; men 1).

Data-analysis

First, we calculate the descriptive statistics and correlations for all variables measured in our study. Second, we perform a path analysis based on our theoretical framework. Scale scores for each participant are obtained by averaging the individual item scores. The data of our sample have a nested structure as teachers are nested within schools. Given the fact that our variables were all assessed at the individual level and that we want to capture the psychological processes that lead to beginning teachers' intention to leave the profession we decide not to apply multilevel analysis (Muthén & Muthén, 1998-2012). However, we reckon with the clustered structure of our data by using the R packages lavaan (Rosseel, 2012) and lavaan.survey (Oberski, 2014). Lavaan.survey allows to perform structural equation modeling analyses on clustered data by taking into account the complex sampling design. As previously mentioned, teachers are nested within schools in our sample. Model parameter estimates are consistently aggregated over clusters while no explicit modeling of the effects of clusters is involved. As such, standard errors are corrected for the fact that observations are not independent. In order to assess the model fit, we use well-established indices such as the χ^2 test, the comparative fit index (CFI), the Tucker Lewis index (TLI), the standardized root mean residual (SRMR), and the root mean squared error of approximation (RMSEA). A good model fit has a non-significant test statistic on the χ^2 test ($p > .05$). For well-specified models, a CFI and TLI greater than .90 reflects an

acceptable fit and a CFI and TLI greater than .95 indicate a good fit to the data. Lastly, the fit of the model is considered acceptable when SRMR ≤ .08 and RMSEA ≤ .06 (L.-T. Hu & Bentler, 1999).

In total, 10 cases show missing values. These missing data may be due to drop out of the beginning teachers in the middle of the questionnaire. Furthermore, it is plausible that beginning teachers overlook a specific item of a particular scale. However, an ANOVA-analysis has revealed that there is no significant difference between the group of beginning teachers who complete the entire questionnaire and the group of beginning teachers who did not fill out on the variable outcome 'intention to leave the job'. Therefore, we expect the missingness to be non-systematic. Cases with missing values for at least one variable that we took into account in the data-analysis are excluded from the analysis. In addition, we have deleted four cases because they are identified as influential cases for the path analysis.

Results

Descriptive statistics and correlations

The means (M), standard deviations (SD), and bivariate correlations are presented in Table 1. Descriptive statistics suggest that the beginning teachers have low intentions to leave the profession (M = 1.43). Furthermore, the mean scores of affective commitment (M = 3.90) and teacher self-efficacy (M = 3.97) are high. The mean for job insecurity (M = 2.66) is relatively low whereas the mean for teacher autonomy is high (M = 3.81). Moreover, beginning teachers frequently have in-depth conversations with colleagues about educational issues (M = 3.25) and feel collectively responsible for student learning (M = 3.78). Lastly, it is noteworthy that teachers seldom visit each other's classroom (M = 2.05). The correlation matrix shows that the intention to leave the job is negatively correlated with reflective dialogue, collective responsibility, teacher self-efficacy, and affective commitment and positively correlated with gender.

Table 1. *Means (M), Standard Deviations (SD), and correlations of study variables.*

		M	*SD*	1	2	3	4	5	6	7	8	9
1.	Job insecurity	2.66	.95	–								
2.	Teacher autonomy	3.81	.51	.011	–							
3.	Deprivatized practice	2.05	.77	.081	.008	–						
4.	Reflective dialogue	3.25	.63	.062	-.081	.401**	–					
5.	Collective responsibility	3.78	.66	.140*	.131*	.205**	.417**	–				
6.	Teacher self-efficacy	3.97	.39	-.012	.238**	.214**	.217**	.292**	–			
7.	Affective commitment	3.90	.67	.001	.236**	.039	.259**	.448**	.243**	–		
8.	Intention to leave the job	1.43	.68	.069	.006	-.081	-.134*	-.152*	-.278**	-.400**	–	
9.	Gender	–	–	-.022	.069	.023	.016	.006	-.006	-.098	.205**	–

*Note. * p < .05; ** p < .01.*

However, there is no statistically significant correlation between the intention to leave the job on the one hand and job insecurity, teacher autonomy, and deprivatized practice on the other hand. Furthermore, affective commitment is positively correlated with all job resources except for deprivatized practice. Also, no statistically significant correlation is found between affective commitment and job insecurity. Furthermore, the correlation matrix has revealed that teacher self-efficacy has a positive correlation with all the job resources.

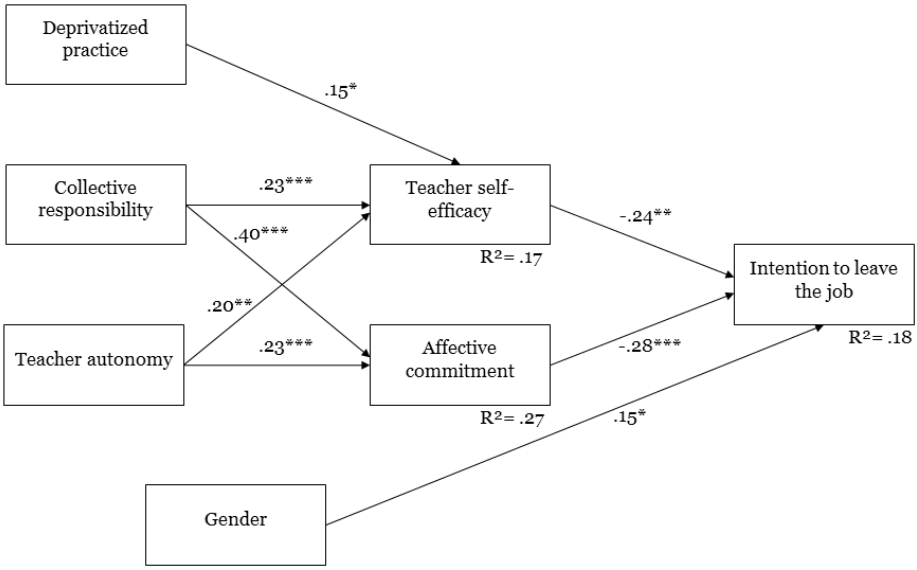

Figure 3. Path model (n = 258) explaining beginning teachers' intention to leave the job in terms of job resources, teacher self-efficacy, and affective commitment (*p < .05; **p < .01; ***p < .001).

Path analysis

We tested our research model as presented in Figure 2 through a path analysis. The results of this analysis revealed a good fit of the model: $\chi^2 = 4.357$, df = 4, p = .36, CFI = 1, TLI = .99, RMSEA = .02, and SRMR = .02. The regression weights, significance levels, and explained variance of the model are reported in Figure 3. For the sake of clarity, the non-significant relationships were omitted from the figure.

To facilitate interpretation direct, indirect, and total effects on the variable 'intention to leave the job' are included in Table 2.

Table 2. *Direct, indirect, and total effects of explanatory variables on beginning teachers' intention to leave the job (n = 258).*

	Intention to leave the job					
	Path teacher self-efficacy			Path affective commitment		
	Direct	Indirect	Total	Direct	Indirect	Total
Teachers' psychological states:						
Teacher self-efficacy	-.24**		-.24**			
Affective commitment				-.28***		-.28***
Job insecurity				-.01	.01	.00
Job resources:						
Teacher autonomy	.05	-.05*	.00	.05	-.07**	-.02
Deprivatized practice	.04	-.04	.00	.04	.03	.07
Reflective dialogue	-.01	-.02	-.03	-.01	-.04	-.06
Collective responsibility	-.03	-.05**	-.08	-.03	-.11***	-.14*

*Note. * p < .05; ** p < .01;***p < .001.*

Our tested model shows that a combination of job resources, teacher self-efficacy, and affective commitment decreases beginning teachers' intention to leave the job. Firstly, beginning teachers' intention to leave the job is directly influenced by teacher self-efficacy, affective commitment, and gender. Although we also expected a direct effect of job insecurity, teacher autonomy, and the PLC characteristics, our results did not confirm this expectation. Secondly, the direct and indirect effects (Table 2) revealed that teacher self-efficacy fully mediates the relationship between teacher autonomy and

collective responsibility on the one hand and the intention to leave the job on the other hand. In addition, the relationship between deprivatized practice and teacher self-efficacy is significant. However, the indirect effect of deprivatized practice on the intention to leave the job through teacher self-efficacy is statistically not significant at the 5% significance level. Furthermore, the relationship between reflective dialogue and the intention to leave the job via teacher self-efficacy is absent. Thirdly, the pathways between teacher autonomy and the intention to leave the job and collective responsibility and the intention to leave the job are fully mediated by the affective commitment of beginning teachers. In contrast to our hypothesis, affective commitment did not mediate the relationship between the PLC characteristics 'reflective dialogue' and 'deprivatized practice' and beginning teachers' intention to leave the job. Also, job insecurity did not indirectly influence beginning teachers' intention to leave the job. The total amount of explained variance in beginning teachers' self-efficacy and affective commitment are respectively 17% and 27%. In addition, the explained variance of beginning teachers' intention to leave the job is 18%.

Discussion

In this study, we formulated and tested a model on how job insecurity, the job resources (i.e. teacher autonomy and PLC characteristics), and psychological states (i.e. teacher self-efficacy, and affective commitment) are related to beginning teachers' intention to leave the job. The three major findings of this study are: a) teacher self-efficacy, affective commitment, and gender are directly associated with the intention to leave the profession, b) teacher autonomy and collective responsibility play an essential role in beginning teachers' intention to leave the job through their relationships with teacher self-efficacy and affective commitment, c) job insecurity is not significantly related to beginning teachers' intention to leave the job. The findings of this study are discussed below.

First of all, it is striking that the intention to leave the job is strongly determined by the beginning teachers' levels of self-efficacy and affective commitment. Our findings indicate that these two psychological factors play a

crucial role in the way intention to leave the profession is related to how beginning teachers perceive their work environment. The direct and negative relationship between self-efficacy and intention to leave the job is in line with previous research (e.g. Hoigaard et al., 2012; Hong 2012; Wang et al., 2015). Furthermore, the direct and negative relationship between affective commitment and beginning teachers' intention to leave the job is consistent with prior findings. First, with Meyer et al. (2002) who found that of all forms of commitment, affective commitment had the strongest negative correlation with turnover intentions. Second, with a study by Carmeli and Weisberg (2006) which pointed out that employees who were more attached to an organization have lower turnover intentions.

Next to teacher self-efficacy and affective commitment, only gender is directly and positively related to the intention of beginning teachers to leave the profession. As such, similarly with previous research (e.g. Addi-Raccah, 2005; Struyven & Vanthournout, 2014), we observed that novice male teachers have higher intentions to leave the job than their novice female colleagues. According to Stinebrickner (2001) men have much greater opportunities for higher-paying non-teaching jobs. Stinebrickner (2001) indicated that this relative attractiveness of non-teaching jobs may be the primary cause of the teacher attrition for male teachers. Furthermore, King (1993) found that male teachers were more attracted by salary considerations and professional prestige they expected in teaching than female teachers. This might explain why male beginning teachers have higher turnover intentions in our study.

Against our expectations, none of the job resources have a direct relationship with beginning teachers' intention to leave the profession. Instead, the relationships between the job resources and the intention to leave the job are fully mediated by teacher self-efficacy and affective commitment. Our findings are in line with the study by Karatepe (2015), who used the motivational process of the JD-R model as the theoretical framework of his study. He also found that self-efficacy fully mediates the impact of a supportive work environment on turnover intentions. In addition, Bakker, Demerouti, and

Schaufeli (2003) found that affective commitment and dedication act as a pure mediator between job resources and turnover intentions. Our findings confirmed the fully mediating function of both self-efficacy and affective commitment for teacher autonomy and collective responsibility. As such, this means that when beginning teachers receive more autonomy they express higher levels of affective commitment and self-efficacy. In turn, teachers with higher levels of affective commitment and self-efficacy report lower intentions to leave the job. Furthermore, when beginning teachers perceive a higher collectively responsibility between teachers for student learning, they acquire more self-efficacy and they are more committed to their organization, which in turn leads to a decrease in the intention to leave the profession.

Noteworthy is that deprivatized practice has a direct significant relationship with teacher self-efficacy but teacher self-efficacy does not mediate the relationship between deprivatized practice and beginning teachers' intention to leave the job. Additionally, reflective dialogue did not have a direct nor an indirect relationship with beginning teachers' intention to leave the job. According to Bryk, Camburn, and Louis (1999) collective responsibility belongs to the mental dimension of a PLC whereas deprivatized practice and reflective dialogue are covered by the behavioral dimension. This means that collective responsibility is related to beginning teachers' feeling to be mentally supported by their colleagues. Allowing teachers to have in-depth conversations with colleagues and give them the opportunities to visit each other's classroom practice seem to be less important to increase beginning teachers' self-efficacy than creating a feeling of collective responsibility.

Deprivatized practice and reflective dialogue have also no indirect effect on teachers' intention to leave the job via its relation with affective commitment. As mentioned above, collective responsibility functions as a mental structure whereby teachers' feeling of the mental support they get from their colleagues is enhanced. This might explain why collective responsibility is related to affective commitment and indirectly influences beginning teachers' intention to leave the profession. Deprivatized practice and reflective dialogue

are more behavioral PLC characteristics that have a much lesser influence on affective commitment. It is not because teachers observe each other's practice or consult one another that they become more committed to the school. It is because they feel collectively responsible for the way they teach and for their students. This again stresses the psychological nature of the studied process.

Finally, it is remarkable that job insecurity could not be identified as an important factor that lowers the intention of beginning teachers to leave the profession. Also, job insecurity is not significantly associated with affective commitment. Previous research revealed that job insecurity has been found to be problematic for the affective commitment of employees with permanent contracts. However, this was not the case for workers in temporary employment forms that a priori consist of job insecurity (De Cuyper & De Witte, 2007). Likewise, De Witte and Näswall (2003) revealed that turnover intentions were the highest among those employees with a permanent job who experienced high levels of perceived job insecurity. As beginning teachers always start in a temporary position, it makes sense that they expect job insecurity. Consequently, job insecurity may be less problematic for novice teachers and therefore, has no effect on beginning teachers' affective commitment and intention to leave the job. In other words, it is not job insecurity that makes novices consider to quit teaching. As such, we can conclude that especially collective responsibility and teacher autonomy in combination with teacher self-efficacy and affective commitment can stimulate beginning teachers to remain in the teaching profession. Hence, this study contributes to the understanding of the buffering factors and underlying psychological mechanisms that decrease the intention of beginning teachers to leave education.

Limitations and suggestions for further research

Certainly, there are limitations to our study that require future research. First, we measured the intention to leave the job instead of actual turnover. Although, previous studies recognized that the intention to leave the job is an optimal variable to predict actual turnover (e.g. T.W. Lee and Mowday, 1987)

more research with actual turnover measures is needed to affirm the findings of this study.

In addition, our results are obtained with self-report measures from a single source. Consequently, the findings of our study must be interpreted with caution. While we consider that the use of self-report measures is justified in our study as the respondents were asked to express their judgment on relatively concrete attitudes and behavior, which leaves little room for inference (cf. Doty and Glick, 1998), self-reports are still sensitive to response tendencies. As such, teachers might provide for instance social desirable answers. In research, it is common to measure school variables (PLC characteristics and autonomy) through self-reports but this provides a subjective experience of teachers about the school context instead of an objective measure. Therefore, we need to be careful with our findings related to the role of the school.

Hence, we advise that researchers combine sources and investigate convergence between methods. In a qualitative research design scholars can integrate a combination of methods such as interviews, logbooks, and observations. Quantitative research might be useful in which data can be collected through objective measures of the school context.

Finally, our study is limited by the cross-sectional design. Path analysis only tests whether a model fits the data and cannot prove causal relationships. A longitudinal design is desirable to indicate causal effects and verify consistency.

Practical implications

Despite the limitations, our study contributes to the understanding of the factors that play a role in beginning teachers' intention to leave the job. First of all, the often claimed impact of job insecurity for beginning teachers does not seem to play that important role for their intentions to leave the profession. This is an important conclusion for policy makers. Often, policy recommendations suggest that beginning teachers should have more stable contracts and reduced job insecurity to decrease the turnover of beginning teachers. Our results seem to contradict these suggestions. In fact, our results

suggest that in order to reduce beginning teachers' turnover intentions, schools could allow beginning teachers to work autonomously and to give them personal responsibility to plan their own lessons and teaching methods. Our study also indicates that schools must provide those conditions that strengthen a joint sense of responsibility toward student learning. In doing so, schools can stimulate joint decision-making to create a sense of shared responsibility among teachers. Merely offering collaborative opportunities such as deprivatized practice and reflective dialogue may not be enough. Shared beliefs about institutional purposes, practices, and desired behavior within schools need to provide a normative structure that governs professional behavior and mentally supports teachers. Beginning teachers who experience this sense of mental support together with a high degree of autonomy will be more committed to the school and have higher levels of self-efficacy, and in turn, are more likely to stay in the teaching profession. As such, both school leaders and policy makers need to be aware of the buffering school factors and psychological processes that lead to reduced intentions of teachers to leave the profession. In addition, it seems important that principal training programs learn and guide school leaders how to develop and install a school policy that pays attention to the supportive school factors we identified in this study. Furthermore, collaboration and joint decision-making among student teachers should be an important element of teacher training programs. Also, we believe it is crucial that teacher educators respect the autonomy of student teachers and allow them to experiment with teaching methods, strategies, and forms of pupil assessment during their internship. Lastly, our research has implications for school improvement agencies. These agencies can provide schools with external professional support on how to develop a school policy that includes supportive school factors and set adequate actions to put this policy in practice. Hence, we suggest that support from different levels of the educational system that are aligned with each other can help schools to strengthen their teacher support and to reduce beginning teachers' intention to leave the profession.

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Chapter 6

General discussion and conclusion

Abstract

The goal of this dissertation is to understand how professional learning communities (PLCs) help beginning teachers to stay in the profession and professionalize their teaching related to differentiated instruction (DI). Furthermore, this dissertation aims to gain insight in the complexity of other school factors next to PLCs, contextual factors, and psychological states that foster beginning teachers' professional learning in DI and reduce their intention to leave the job. In this final chapter, an integrated overview of the studies reported in the previous chapters is provided. This chapter discusses the results of the different studies along the three research objectives. In addition, an overarching discussion of the results as well as the limitations of the different studies with directions for future research are presented. This chapter concludes with the implications of this dissertation for policy and practice.

Introduction

Research reveals that starting a career as a teacher is very stressful and is characterized by many challenges and duties (e.g. Tynjälä & Heikkinen, 2011). Two prominent challenges related to beginning teachers that are of concern in education are 1) the professionalization of beginning teachers in differentiated instruction (DI) and 2) reducing the high turnover rates of beginning teachers (Fantilli & McDougall, 2009; Grissmer & Kirby, 1997; Mansfield, Beltman, & Price, 2014). Many researchers have advocated the need for a more advanced understanding of both teachers' professional learning and their turnover intentions (Opfer & Pedder, 2011; Price, 2004). Despite these calls, a considerable body of literature reports on teachers' professional learning and teachers' turnover intentions by studying individual teacher characteristics in isolation from the learning environment in which teachers learn and teach (e.g. Bottery & Wright, 1996). To close this gap in research, we have investigated how professional learning communities (PLCs), which are identified as those learning environments that offer teachers valuable opportunities to collaborate with colleagues, affect beginning teachers' professional learning in DI and their turnover intentions (i.e. beginning teachers' outcomes in this dissertation). In order to understand the complexity of the processes that lead to the abovementioned outcomes of beginning teachers we aim to uncover other factors that support beginning teachers' professional learning in DI and buffer their intention to leave the job.

Based on a review of the literature, presented in chapter 1, we have developed an analytical framework for beginning teachers' professional learning in DI and their turnover intentions. Building on this analytical framework, we have argued that the complexity of these outcomes might stem from three general factors: (1) school factors, (2) contextual factors, and (3) psychological states of beginning teachers. With respect to the role of the school context, we specifically considered the role of PLCs and their development within schools. Furthermore, we examined if teacher autonomy is an important school factor in both beginning teachers' professional learning in DI and their

intention to leave the job. Also, we explored if school leadership, school DI policy, and diversity in student population within schools enhance beginning teachers' professional learning in DI. With regard to the contextual factors, we selected teacher education as a contextual factor that may affect beginning teachers' professionalization in DI and job insecurity as a contextual factor that might reduce beginning teachers' intention to leave the job. At the individual level, we studied teacher self-efficacy as a psychological state that may stimulate beginning teachers' professional learning in DI. Teacher self-efficacy and affective commitment were factors that we have taken into account as psychological states that may reduce beginning teachers' intention to leave the job. Related to this analytical framework, we formulated three research objectives. The three research objectives that we put forward in the first chapter are the following:

Research objective 1 (RO1): Examining the relationship between PLC characteristics, other relevant school factors (teacher autonomy, school leadership, school DI policy, and diversity in student population), teacher education, and teacher self-efficacy with beginning teachers' professional learning in DI.

Research objective 2 (RO2): Examining the relationship between PLC characteristics, teacher autonomy, job insecurity, teacher self-efficacy, and affective commitment with beginning teachers' intention to leave the job.

Research objective 3 (RO3): Investigating the PLC development in schools and exploring the factors that support schools to develop a PLC.

These research objectives have been addressed in the previous chapters of this dissertation through quantitative and qualitative studies. In the following paragraphs, we discuss our main results in relation to each of the research objectives. In addition, we outline the limitations of this dissertation research and present several possible directions for future research. Finally, we conclude with the implications for theory, policy, and practice.

Overview of the research objectives and the main results

Research objective one: Examining the relationship between PLC characteristics, other relevant school factors (teacher autonomy, school leadership, school DI policy, and diversity in student population), teacher education, and teacher self-efficacy with beginning teachers' professional learning in DI.

In the introductory chapter of this dissertation we showed that most research on PLCs focused on student learning and achievement (Lomos, Hofman, & Bosker, 2011; Thompson, Gregg, & Niska, 2004; Vescio, Ross, & Adams, 2008), and less on teachers' professional learning. Namely, few studies investigated how PLCs guide beginning teachers in their learning processes related to DI. We have argued that more research is needed to identify other school and contextual factors that are important for beginning teachers' professional learning in DI. To this end, we explored the relationship between PLCs, other school (i.e. teacher autonomy, school leadership, school DI policy, diversity in student population) and contextual (i.e. teacher education) factors and beginning teachers' professional learning in DI. In line with Geijsel, Sleegers, Stoel, and Krüger (2009), we propose that research needs to investigate the way school factors in combination with teacher self-efficacy influence teachers' professional learning. In order to clarify how the abovementioned school factors, teacher education, and teacher self-efficacy are related to beginning teachers' professional learning in DI (i.e. changes in DI practice and learning in interaction related to DI) we conducted two quantitative studies based on questionnaires filled out by beginning teachers (cf. chapters 2 and 3). Also, policy documents that describe the school's view on DI were taken into consideration (cf. chapter 3).

To gain understanding of beginning teachers' changes in DI practice in chapter 2, three PLC characteristics (i.e. reflective dialogue, deprivatized practice, and collective responsibility) and teacher autonomy were studied in

relation to teacher self-efficacy and beginning teachers' learning processes in DI. We performed a path analysis to test the direct and indirect effects of the PLC characteristics, teacher autonomy, and teacher self-efficacy on beginning teachers' changes in DI practice. The results showed that the PLC characteristic 'reflective dialogue' had a direct and positive relationship with changes in DI practice. This finding is in line with Tomlinson et al. (2003) who proposed that initiatives from teachers to share and discuss ideas and knowledge about effective differentiated educational approaches are crucial to stimulate the use of DI in the classroom practice.

Our results did not show a direct relationship between deprivatized practice and changes in DI practice. This finding is different from the results reported by Wahlstrom and Louis (2008) who found that deprivatized practice is an important predictor of flexible grouping practices. Note, however, that Wahlstrom and Louis (2008) investigated a specific DI form, namely flexible grouping practice, while our study took different DI forms, such as differentiated assessment forms and instructional strategies, into account. This may explain the diverging observations.

Furthermore, we observed that collective responsibility did not directly influence beginning teachers' changes in DI practice. This finding is in contrast with a study by Scribner, Hager, and Warne (2002) who argued that teachers in schools with a strong sense of collective responsibility toward student learning more frequently make changes in their classroom practice. However, in our study, collective responsibility was indirectly related with beginning teachers' changes in DI practice through its relationship with teacher self-efficacy. More specifically, the path analysis showed that teacher self-efficacy fully mediates the relationship between collective responsibility and beginning teachers' changes in DI practice. This indicates that the more beginning teachers experience a sense of collective responsibility toward student learning among the members of the school team, the more they believe in their ability to address the learning needs of the students. In turn, the higher beginning teachers' levels of self-efficacy are, the more they adapt their instructional

methods to meet the students' needs. Interestingly, teacher self-efficacy did not mediate the relationship between reflective dialogue and deprivatized practice on the one hand and changes in DI practice on the other. We will discuss this finding more in-depth in the conclusion of this section.

A second main finding from our research was that teacher autonomy had a positive and direct relationship with changes in DI practice. This is in line with prior research showing that teacher autonomy increases teachers' level of professionalism (Pearson & Moomaw, 2005). Our path analysis also revealed a mediating effect of teacher self-efficacy in the path between teacher autonomy and changes in DI practice. In particular, this study found that more autonomous beginning teachers expressed higher levels of self-efficacy. In turn, self-efficacious beginning teachers reported more that they implement differentiated instructional methods. Thus, teacher autonomy has both a positive direct and indirect (through teacher self-efficacy) effect on changes in DI practice. This result is in line with Xanthopoulou, Bakker, Demerouti, and Schaufeli (2007) who found a partial mediating effect of self-efficacy in the relationship between work autonomy and performance.

In chapter 3, beginning teachers' professional learning activities in DI (i.e. learning in interaction related to DI and changes in DI practice) were further investigated. More specifically, different sets of contextual and school factors were included in this study. As teacher training programs can shape beginning teachers' educational beliefs with regard to DI, teacher education was considered as a contextual factor that can make a difference in stimulating beginning teachers to participate in DI learning activities. Furthermore, the above-described results showed that PLC characteristics, especially reflective dialogue and collective responsibility, matter for beginning teachers' changes in DI practice. Hence, the three PLC characteristics were also put forward in this study as possible supportive school factors that stimulate beginning teachers' engagement in DI learning activities. Moreover, scholars proposed that the support given by principals is crucial to stimulate beginning teachers to engage in DI learning activities (Hertberg-Davis & Brighton, 2006;

McAdamis, 2001). However, there is a need to clarify which particular role principal leadership plays in the professional learning processes of beginning teachers in DI. In this regard, we wanted to examine the importance of transformational and instructional leadership in beginning teachers' participation in DI learning activities. In addition, we explicated in chapter 1 that a school DI policy stimulates a more focused professionalization of teachers (Cohen & Hill, 2000). To advance insights in this relationship, educational type and policy documents toward DI were integrated in this study. Finally, the association between diversity in student populations within schools and DI learning activities is underexplored in current research and will be examined in this study.

Multilevel analysis indicated that teacher education is negatively related to the professional learning activity learning in interaction related to DI and is positively related to changes in DI practice. This implies that beginning teachers, who perceived that their teacher training program changed their mindset toward DI in a positive way, felt more confident and experienced little need to consult colleagues for feedback about DI implementation. This finding also suggests that when teacher training programs changed beginning teachers' mindset toward DI in a positive way, it also stimulates beginning teachers to flexibly adapt their classroom behavior to the individual needs of their students.

Our study did not find a direct relationship between transformational and instructional leadership and beginning teachers' professional learning in DI. In the general introduction of this dissertation (Chapter 1), we discussed that different perspectives on how principals support teachers' professional learning occur in the literature. In the first perspective, tested in chapter 3, scholars suggest that principal leadership directly influence the professional learning processes of teachers. Our results clearly contradict that transformational and instructional leadership are direct supportive school factors for beginning teachers' participation in DI learning activities. A possible explanation for these non-significant relationships is that principals indirectly, instead of directly, stimulate professional learning by shaping the nature of

school conditions that facilitate PLC development (Leithwood, Seashore Louis, Anderson, & Wahlstrom, 2004). In the introductory chapter of this dissertation, we identified this reasoning as the second perspective on the relationship between principal leadership styles and teachers' professional learning. Evidence in support of this second perspective will be given in the description of the main results in relation to the third research objective.

Next, the results of the multilevel analysis confirmed the importance of the PLC characteristics for beginning teachers' professional learning in DI. The more schools offer beginning teachers opportunities to have in-depth conversations with colleagues about educational issues and to observe the classroom practice of other teachers the more frequently beginning teachers ask for feedback or information from colleague-teachers about DI implementation. In addition, reflective dialogue is positively related to changes in DI practice, which reaffirms the findings of chapter 2. Also in this study, collective responsibility did not have a direct relationship with the DI learning activities.

Furthermore, we found that educational type was positively related to both DI learning activities. Beginning teachers in alternative schools ask more for feedback and information on DI implementation and experiment on their own which differentiated teaching methods work the best for their students in comparison to beginning teachers in traditional schools. However, policy documents toward DI developed in schools did not enhance the level of participation in the DI learning activities. In chapter 3, we suggested that this could possibly be explained by the gap between formal policy documents and the actual practice. Giving greater priority to a certain educational approach in schools requires more than developing policy documents. It requires a strong pedagogical vision realized through the social capacity of the school (Cohen, McCabe, Michelli, & Pickeral, 2009). As alternative schools have a pedagogical vision centralized around teaching practices that acknowledge and accommodate diverse learning trajectories for students it is not surprising that

these schools succeed better at stimulating beginning teachers to engage in professional learning activities related to DI (Hazel & Allen, 2013).

Finally, the multilevel analysis showed that beginning teachers teaching in schools with a high percentage of students from a low SES background indicated more changes in DI practice than their beginning colleagues in schools with a high percentage of students from a high SES background. This is in line with the statement of Timperley (2008) that diversity in student population is strongly related to what and how teachers teach.

To conclude, we found that the PLC characteristics 'reflective dialogue' and 'deprivatized practice' are directly related to beginning teachers' learning processes related to DI. However, it is striking that we could not identify a direct relationship between collective responsibility and beginning teachers' participation in DI learning activities. Reflective dialogue and deprivatized practice are identified in the literature as behavioral features and collective responsibility as a normative feature. Our results revealed that the normative feature 'collective responsibility' affects beginning teachers' self-efficacy and by increasing the level of self-efficacy, collective responsibility indirectly matters for the professionalization of beginning teachers in DI. Hence, normative features act more on the psychological processes of beginning teachers whereas the behavioral features are important for the behavioral actions beginning teachers execute in order to professionalize their teaching related to DI. Furthermore, educational type is a school factor, and teacher education a contextual factor that is significant for both professional learning activities whereas the school factors 'teacher autonomy' and 'diversity in student population' affect beginning teachers' changes in DI practice. As such, based on these findings, we could identify the school context as a key element in the learning processes of beginning teachers related to DI and we can state that teacher education is a stepping stone for the continuous professional learning of beginning teachers.

Research objective 2 (RO2): Examining the relationship between PLC characteristics, teacher autonomy, job insecurity, teacher self-efficacy, and affective commitment with beginning teachers' intention to leave the job.

In chapter 1, we discussed the importance of PLC characteristics, teacher autonomy, and job insecurity for teachers' turnover intentions. Moreover, in the literature on the social cognitive theory and the job demand resources (JD-R) model authors accredited the mediating role of self-efficacy and affective commitment in explaining employees' turnover intentions (Avey, Luthans, & Jensen, 2009; Bakker, Demerouti, & Schaufeli, 2003; Bandura, 1977). However, in educational research, this topic is still mainly left untouched. Our study described in chapter 5 wants to contribute to this research need.

In chapter 5, we studied the direct relationships between school and contextual factors and beginning teachers' intention to leave the job. More specifically, the PLC characteristics and teacher autonomy were the independent school factors and job insecurity was the independent contextual factor in the hypothesized model. Moreover, we examined the indirect effects of the school and contextual factors through their relationships with the psychological states of beginning teachers (i.e. teacher self-efficacy and affective commitment). Remarkably, none of the independent school and contextual factors directly influenced beginning teachers' intention to leave the job. However, the results of this analysis suggested a pure mediating effect of teacher self-efficacy in the relationship between teacher autonomy and collective responsibility on the one hand and the intention to leave the job on the other hand. This corroborates the findings of Karatepe (2015) who found that self-efficacy fully mediates the impact of a supportive work environment on turnover intentions. The path analysis also revealed that teacher autonomy and collective responsibility had an indirect relationship with beginning teachers' turnover intentions mediated by affective commitment. This is in line with Bakker et al. (2003) who pointed out that affective commitment and dedication acts as a full mediator between job resources and turnover

intentions. Hence, our results revealed that feeling collectively responsible for student learning and experience autonomy increases beginning teachers' levels of affective commitment and self-efficacy. In turn, these enhanced levels of commitment and efficacy lower beginning teachers' intentions to leave the teaching profession. It is important to note that collective responsibility is the only PLC characteristic that plays a crucial role for beginning teachers' intention to leave the job. Deprivatized practice and reflective dialogue could not be identified as mitigating factors. Again, as was demonstrated in chapter 2, collective responsibility is crucial for the psychological states of beginning teachers. It is not because teachers observe each other's practice or discuss educational issues with one another that they become more committed to the school and experience higher levels of teacher self-efficacy. Also, it is not job insecurity that makes novices consider to quit teaching. Feeling collectively responsible and having the space to work autonomously stimulates teachers to stay in the profession. These findings stress the psychological nature of the studied process.

Based on the results of chapter 2, 3, and 5, we can conclude that both school factors and teachers' psychological states are important in facilitating beginning teachers' professional learning in DI and to reduce beginning teachers' turnover intentions. More specifically, chapter 2 and 5 contribute to the understanding of the interplay between teachers' psychological states and the school factors in relation to beginning teachers' learning in DI and turnover intentions. Furthermore, the findings in chapter 2, 3, and 5 concerning the dimensions of the PLC concept were consistent. As previously mentioned, offering teachers opportunities to have in-depth conversations with one another and to observe the classroom practice of colleague-teachers stimulates the professional growth of beginning teachers related to DI. Collective responsibility indirectly matters for beginning teachers' professionalization in DI and their turnover intentions. This kind of mental support enhances the levels of commitment and efficacy which in turn foster beginning teachers' professionalization in DI and reduce their turnover intentions.

Research objective 3 (RO3): Investigating the PLC development in schools and exploring the factors that support schools to develop a PLC.

As described above, PLC characteristics can stimulate beginning teachers' professional learning in DI. However, more research is required to gain insight into the development of a PLC that considers the PLC characteristics 'reflective dialogue', 'deprivatized practice', and 'collective responsibility'. Furthermore, empirical research that analyzed which facilitating school conditions support PLC development is lacking. Therefore, in this dissertation a study was conducted based on the quantitative results of chapter 2. More specifically, the scores on the changes in DI practice scale led to a critical case sampling in which one school with high scores (case A), one school with medium scores (case B), and one school with low scores (case C) on the changes in DI practice scale were selected. Hence, the sampled schools clearly differed with regard to levels of beginning teachers' professional learning in DI. By exploring how PLC characteristics were put in practice in these schools we aimed to examine the PLC development within the three different schools. In addition, we investigated in this chapter which structural and cultural school conditions facilitated this PLC development and how these school conditions were generated in the three schools. Interviews with school leaders, special needs coordinators, and beginning teachers were conducted.

The results indicated that there was a difference in PLC development among the three selected schools. Based on the elaboration of the PLC characteristics in the three schools we could situate, case C in the 'beginning stage', case B in the 'evolving stage', and case A in the 'mature stage' of PLC development. These stages are in line with the studies by Grossman, Wineburg, and Woolworth (2001) and Louis and Kruse (1995). The stages of PLC development differently affected the learning processes of beginning teachers in DI. In particular, there was little support from the school team in case C to help beginning teachers in their learning processes in DI. In case B, beginning teachers mentioned that the school team helped them to a certain extent to

professionalize in DI whereas beginning teachers in case A referred to a diversity of actions within the school team that fostered their professional learning in DI. In this regard, the results of the qualitative study confirm the results of the quantitative studies by revealing that the more beginning teachers get opportunities to collaborate with other colleagues and the more beginning teachers experience a sense of collective responsibility, the more the professional learning of beginning teachers in DI is enhanced.

When looking closer to the development process of PLCs, differences between the schools in relation to the structural and cultural school conditions could be observed. For the structural dimension, the results of this study revealed that more organizational structures (i.e. scheduled planning time and organizational decisions to facilitate DI implementation) were installed to stimulate PLC development and DI implementation in case A than in case B and C. Only in case A organizational structures, such as a differentiation table and multigrade teaching, were installed to facilitate DI implementation. In addition, our data showed that the collaboration among the members of the school team in case C was mainly focused on informal and individual initiatives. In case B, collaboration was centered around formally structured moments whereas in case A both formal and informal meetings were indicated as valuable opportunities to collaborate. We found that the more organizational structures were installed in schools, which was especially the case in school A, the more beginning teachers got opportunities to discuss educational issues with other members of the school team and observed teaching practice of colleague-teachers.

Also, the three schools differed in the elaboration of the cultural school conditions, namely trust and creating and maintaining a DI vision. More specifically, our data showed that respondents in case A described a high level of trust among the members of the school team which fostered reflective dialogue and deprivatized practice. This finding is in line with the studies by Atteberry and Bryk (2011) and Stoll, Bolam, McMahon, Wallace, and Thomas

(2006). In case B and C lower levels of trust were found. These lower levels of trust were experienced as barriers to build a PLC.

Concerning creating and maintaining a DI vision, the results indicated that in case A several people were involved to develop a clear DI vision. Not only the principal and special needs coordinator, who was considered as a DI expert, but also experienced teachers were involved to set the same goals related to DI. Furthermore, the entire teaching team was actively involved in the continued development of the DI vision. Also, the principal took time to inform beginning teachers that differentiated teaching was an important value of the school. Due to the involvement of the entire school team, a vivid DI vision was present in case A supported by the principal, special needs coordinator, and all teachers. Similar to what Senge (2006) stated, we found that these initiatives to create and maintain a common vision increased the sense of collective responsibility among the members of the school team. In turn, a high level of collective responsibility stimulated teachers to have more in-depth conversations with one another about educational issues. In case B, the principal was the central figure for the DI implementation together with the school policy staff. Also in this school, the special needs coordinator, who was a member of the school policy staff, was identified as a DI expert. However, teachers were not involved as active participants in building a DI vision, which clarified why no clear DI vision was known and supported by the teaching team. In contrast to case A and B, the development of a DI vision in case C was limited to the principal. The special needs coordinator was not regarded as a DI expert by her colleagues and teachers were neglected as active participants in building a DI vision. This might explain why a sense of unity in the DI vision was lacking which in turn impeded the sense of collective responsibility.

The interviews also revealed that the school leader of case A played a more prominent role in elaborating the structural and cultural school conditions than the school leader of case B and C. The school leader of case A not only invested in creating organizational structures to make the PLC development and the DI implementation possible. He also consciously initiated

the development of a DI vision. The joint responsibility of the team to create a DI vision was also clearly appealed by the school leader. In particular, the principal shared leadership responsibilities with the special needs coordinator and involved experienced teachers to set the same goals related to DI. Furthermore, high levels of trust, organic forms of collaboration, and active engagement of teachers were visible and advocated in this school. In case B, the principal created a formalized structure for communication and maintained an oversight role in building the level of trust among the members of the teaching team. Although the school policy staff was consulted to implement DI in the school, the school leader monitored the DI implementation. Hence, the school leader strongly facilitated the structural school conditions but moderately facilitated the cultural school conditions. Finally, the principal's leadership of case C scored low on both the cultural and structural dimension. The formalized structures available for the team to enable PLC development and DI implementation were limited. Furthermore, there was a limited interaction between the principal and the other members of the school team concerning the DI vision and the principal did not delegate responsibilities related to DI implementation.

The results of this study provide evidence for the second perspective on the supportive role of principal leadership in stimulating beginning teachers' professional learning in DI discussed in chapter 1. More concrete, we explained that in the second perspective researchers suggest that principals' leadership indirectly contribute to teachers' professional learning in DI. In line with Leithwood et al. (2004) our findings revealed that principals indirectly support the learning processes of beginning teachers in DI by shaping the nature of the structural and cultural school conditions that facilitate PLC development.

General discussion

The overarching goal of this dissertation was to further our understanding of the factors involved in beginning teachers' professional learning in DI and their turnover intentions. To this end, we investigated the

development of PLCs within schools and we examined how PLCs influence the abovementioned outcomes of beginning teachers.

There is an increasing notion that schools need to develop toward PLCs in order to deal with the new challenges the teaching profession faces today (e.g. Stoll et al., 2006; Vescio et al., 2008). This notion shapes the support beginning teachers receive when they enter the teaching profession. Traditionally, mentoring has been identified as the collaborative initiative par excellence to advance the professionalization and reduce the early attrition of beginning teachers (Carter & Francis, 2001; Hargreaves & Fullan, 2000; Ingersoll & Smith, 2004; Odell & Ferraro, 1992). More recently, the relevance of PLCs for both beginning teachers' professional learning in DI and their retention in education has been pointed out across all studies of this dissertation. The different studies in chapters 2, 3, and 5 provide more clarity of the PLC concept by revealing that the behavioral dimension (i.e. reflective dialogue and deprivatized practice) of the PLC concept directly matters for the DI learning activities beginning teachers undertake. The normative dimension of the PLC concept (i.e. collective responsibility) acts on beginning teachers' psychological states. Our results in chapter 2 and 5 suggest that by mentally supporting beginning teachers, collective responsibility indirectly affects beginning teachers' professional learning in DI and their turnover intentions. More concrete, a stronger sense of collective responsibility between teachers for what happens in the school and the learning of students makes beginning teachers' feel more confident and enhance the commitment to their school. Due to their increased self-confidence, beginning teachers also feel better and are more willing to make changes in their classroom practice. Also, beginning teachers with a greater confidence and a higher commitment to the school are less inclined to leave the teaching profession.

Furthermore, in chapter 3 we found that teacher education is essential for beginning teachers' professional learning in DI. More concrete, the more beginning teachers indicated that their teacher training program changed their mindset toward DI in a positive way, the more they change their classroom

practice related to DI and the less they feel the need to ask colleagues for feedback about DI implementation. These findings open up the dialogue to rethink teacher induction. Besides the traditional view that mentoring is important, we found that both PLC characteristics and teacher education are two additional factors that require consideration by novel initiatives to improve teacher induction.

In addition, our studies showed that it is not only essential that a school environment creates the conditions in which teachers may benefit from collegial support but it is also crucial that schools facilitate autonomous functioning of beginning teachers. These findings mirror the statements of Clement and Vandenberghe (2000) and Johnson (2006) that collegial support does not automatically lead to professional learning and reduce teacher turnover, but that teachers' autonomy is also important. Our findings across all studies endorse the necessity for building a PLC within a school. However, creating an environment marked by a completely collaborative community without teacher autonomy is undesirable and counterproductive. Our results in chapter 2 and 5 showed that giving teachers autonomy also needs to be a crucial component of the support schools offer. Another remarkable communality in the different studies is that besides PLCs, teacher autonomy affects the psychological processes of beginning teachers. Following the JD-R model of Bakker and Demerouti (2007) we found that the presence of teacher autonomy increases the levels of teacher self-efficacy and affective commitment. In turn, these psychological states foster beginning teachers' professional learning in DI and lower their turnover intentions. These findings strengthen the equal importance of teacher autonomy and PLCs for the abovementioned outcomes of beginning teachers.

Our results also demonstrated that the school's social capacity to promote community cohesion is needful to generate a shared DI vision. The strength of this 'social glue' between members of the school team colors the atmosphere to work together and is of greater importance than developing formal DI policy documents. In line with Cohen et al. (2009), the study

presented in chapter 4 indicated that the higher this social capacity is, the more team members want to develop and contribute to a shared vision. In turn, this shared DI vision proved to be important to foster the sense of collective responsibility within the team and DI learning of beginning teachers. Important to note is that our findings in chapter 4 also revealed that principals' leadership plays a vital role in amplifying the social glue between the team members and thus fostering the sense of collective responsibility. Furthermore, we found in chapter 3 that alternative schools, featured by their strong pedagogical vision related to DI, succeed better in stimulating beginning teachers to engage in DI professional learning activities than traditional schools. These findings expand upon results of previous studies (e.g. Hazel & Allen, 2013) demonstrating that pedagogy-driven schools successfully create inclusive communities for all learners.

Limitations and directions for future research

The studies reported in this dissertation contribute to the scientific understanding of PLCs. Furthermore, this dissertation uncovered how PLC characteristics, other school, and contextual factors support beginning teachers' professional learning in DI and reduce their turnover intentions. At the same time, the present research is not without limitations. As each chapter discussed the limitations of the individual studies, this section describes the general limitations associated with this research project. Based on these limitations, we suggest directions for further research.

Limitations related to the sample

A first limitation pertains to the study sample. All studies were conducted solely with Flemish primary schools. In the general introduction of this dissertation (Chapter 1), we explained that the level of education strongly determines the unit of a PLC. PLCs in primary education include the entire school whereas PLCs in secondary education are often situated on the subject department level (Lomos et al., 2011; Stoll & Louis, 2007). Consequently, our findings cannot be generalized to other educational levels. Therefore, it would

be useful to replicate our findings in subject departments of secondary schools. Moreover, the specific national policy context (i.e., the approval of the decree by the Flemish government to give students with special educational needs reasonable adjustments) might have affected the results of our studies. Due to dissimilarity in educational policies and/or cultures our findings might not generalize to other political or international contexts. It would therefore be interesting to conduct similar studies in other countries with a different policy context.

A second limitation concerns the rather small sample sizes in the different studies. In the qualitative study (Chapter 4), critical case sampling was used. Although the goal of this qualitative study was exploration and description rather than pure hypothesis testing, caution is required in generalizing the results of this study. Consequently, more research with larger samples is needed to confirm the findings of our qualitative study. Also, the sample size and clusters size (i.e. beginning teachers per school) is quite small and varied in the quantitative studies (Chapter 2, 3, and 5). Due to practical reasons, we were not able to ask more primary schools if they wanted to participate in our research project. Moreover, beginning teachers per school only represent a fragmented part of the entire teaching team. Hence, we were unable to enlarge the sample size of the clusters. However, as the small sample and cluster size could affect the accuracy of estimates and standard errors (Hox, 2010), future research could use larger samples to elaborate on our results.

A third limitation is that the data were mainly collected from beginning teachers. In chapter 4, we also took the perspective of school leaders and special needs coordinators into account. However, it would be interesting to consider the perspective of other important actors in chapter 2, 3, and 5 and not solely focus on the self-reports of beginning teachers. Consequently, we would recommend that further research for example address mentors who play a key role in beginning teachers' professional development. It also may be beneficial to involve the perspective of the school leaders in examining beginning teachers' intention to leave the job.

Limitations related to the variables

In order to uncover the learning processes of beginning teachers, which was one of the main research objectives of this dissertation, we examined how PLC characteristics, other relevant school and contextual factors, as well as teacher self-efficacy are related to beginning teachers' participation in professional learning activities. In recent research, however, there is an increased emphasis placed on the role of the teacher for student achievement. More specifically, research assumes that teachers' self-efficacy and their participation in professional learning activities also benefit students' learning and outcomes (e.g. Lumpe, Czerniak, Haney, & Beltyukova, 2012). Yet, we did not explore how teachers' professionalization influences student learning and achievement. Therefore, future research could include student variables to get insight in the relationship between the learning process of teachers and the learning processes and outcomes of students.

Another limitation is the conceptualization of the PLC characteristics. In the general introduction of this dissertation we described the fuzziness of the PLC concept and substantiate the decision to select three specific PLC characteristics, namely reflective dialogue, deprivatized practice, and collective responsibility (Bryk, Camburn, & Louis, 1999; Lomos, 2012; Stoll et al., 2006). However, due to the complexity of the PLC concept, some authors have introduced other characteristics as key variables to define the PLC concept. For instance, 'collective team practices' (Supovitz, 2002), 'policy and evaluation' (Visscher & Witziers, 2004), 'individual or group learning' (Bolam et al., 2005), and 'supportive conditions' (Hord, 1997). Although, we selected the PLC characteristics thoughtfully and deliberately, further reflection on PLCs and their facilitating school conditions is needed. Furthermore, the findings of our studies revealed that behavioral features (i.e. reflective dialogue and deprivatized practice) and normative features (i.e. collective responsibility) differently affect beginning teachers' outcomes. As this work is exploratory in nature, we plea for more research to affirm the differential relationships we uncovered across the studies.

In addition, we used the motivational process of the JD-R model as theoretical framework for chapter 2 and 5 of this dissertation. In both chapters, we selected teacher autonomy and support from colleagues (i.e. the PLC characteristics) as specific job resources. However, performance feedback, supervisory coaching, and time control are also identified as important job resources that decrease employees' turnover intentions (Bakker et al., 2003). Furthermore, opportunities for development is indicated as a job resource that is related to the job performance of beginning teachers (Bakker & Bal, 2010). As such, further research could investigate how important the abovementioned job resources are for beginning teachers' professionalization in DI and their turnover intentions. Moreover, we included only one job demand namely job insecurity in our research model. In this regard, we believe an elaboration of our research model with other relevant job demands such as work overload and emotional demands could be useful.

A fourth limitation is that no distinction was made between first-timers, which are beginning teachers working in their school as their first teaching job, and hoppers, beginning teachers who already worked in other schools before they start working in the school that participated to our research. The professionalization in DI of hoppers and their intention to leave the job may be influenced by earlier experiences they had in other schools. Therefore, it may be fruitful to distinguish first-timers from hoppers in further research and explore if for instance earlier learning opportunities in other schools are related to beginning teachers' learning in DI.

Methodological limitations

A first methodological limitation is the cross sectional nature of the data in the different studies which precludes any conclusions regarding causality. Existing theoretical models such as the JD-R model and studies with a longitudinal design underpin the directions of our hypothesized relationships. For example, the longitudinal study of Holzberger, Philipp, and Kunter (2013) found that teacher self-efficacy has a partial effect on instructional quality. In chapter 2, our findings pointed in the same direction (i.e. teachers' perceptions

of their self-efficacy are important for their perceived changes in practice). However, more studies with a longitudinal design are needed to indicate causal effects as we proposed in our model and verify consistency. Furthermore, considering that a PLC is a dynamic concept that could change over time, it is essential to examine the development of PLCs during a longer time span and therefore conduct longitudinal research. As such, a potential avenue for future research is to explore if schools that are identified as mature PLCs remain to function at this high level and if beginning or evolving PLCs make progress or stagnate over time.

A second limitation concerns the developed scale 'changes in DI practice'. The scale items are rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The amount of teachers who strongly disagreed that they have changed their instructional strategies to better meet the diverse learning needs, interests, and readiness of their students may cause a ceiling effect in the data. Ceiling effects occur at the top end of a scale range. When a ceiling effect is present, information regarding true differences between individuals scoring at the highest possible value is lost and thus only partial information about the scores of individuals scoring at the ceiling is available (McBee, 2010). Therefore, further research could adjust the response categories to verify if the explained variance increases in the different models. Additionally, as mentioned above, all scales in the quantitative studies are measured at one point in time. It is advisable that future research for instance includes two measurement moments of beginning teachers' DI practices to predict changes from one point to another and to get insight in the understanding of the actual changes in classroom practices related to DI.

A third limitation of this research project is that most variables in our quantitative studies are measured by using single source methods, namely self-reports of beginning teachers. To meet this limitation we took school level variables such as educational type and diversity in student population into account. Furthermore, we included data from a second source (i.e. school policy documents) in chapter 3. However, the variable that was conceptualized based

on the policy documents could not be identified as a significant supportive factor. In this regard, we believe it is essential that future research unifies sources and investigates convergence between methods (e.g. combining school policy documents with observing meetings where school policy is discussed) in order to reveal significant supportive factors related to beginning teachers' professional learning and their turnover intentions.

Finally, in line with the third limitation, chapter 4 comprised the perceptual viewpoints of beginning teachers, school leaders, and special needs coordinators in order to validate the responses of the different subgroups. Although, as mentioned, it would be ideal if methodological triangulation, which means that one study uses more than one method to gather data such as combining questionnaires with interviews, observations, and documents (Denzin, 2009), was applied in all studies.

Limitations related to the results

First, while our findings identified important factors that enhance beginning teachers' participation in DI learning activities, a considerable amount of the variance for the learning activities 'changes in DI practice' and 'learning in interaction related to DI' remained unexplained. Furthermore, the effect sizes of the predictors were quite small. This indicates that the complexity of beginning teachers' learning in DI is only partially covered in this dissertation. Hence, other variables might be important in this process. Future research could explore the influence of organizational characteristics, such as teamwork processes, often considered as crucial for the capacity of schools to enhance teachers' professional learning. Moreover, the inclusion of system-level variables for example the support schools get from parents may help researchers to understand teachers' professional learning (Leithwood & Jantzi, 2006; Spillane, Reiser, & Reimer, 2002). Furthermore, classroom conditions (class size and academic heterogeneity) can be added to the model (Smylie, 1988).

Also, the explained variance of the dependent variable in chapter 5 namely 'intention to leave the job' is rather small. In this regard, the energy-

driven process of the JD-R model, where it is hypothesized that high job demands exhaust employees mentally which in turn could lead to the depletion of energy, is a possible approach to investigate beginning teachers' turnover intentions (Bakker & Demerouti, 2007). Moreover, apart from the experiences beginning teachers have in the context of a particular school, meaningful events in other contexts (e.g. other professional careers that offer better pay and provide more opportunities for promotion) may play an important role in beginning teachers' intention to leave the job. To a certain extent, we took into account contextual factors, namely job insecurity, in this dissertation to capture beginning teachers' intention to leave the job. Yet, future research focusing on more contextual factors could be valuable to depict the broader picture of beginning teachers' turnover intentions.

A second limitation relates to the null models we have tested to estimate how much variance could be assigned to the teacher level and the school level. In chapter 3, we found that the variance of the grouping of teachers per school (i.e. school level) is not significantly different from zero. The fact that the school level is not significant could be explained by the small number of individuals per group (average of beginning teachers per school is 4). However, more research is essential to fully disclose the possible influence of the school for groups of beginning teachers.

Implications

Drawing on the data gathered in this dissertation some important theoretical, policy, and practical implications are suggested.

Theoretical implications

This dissertation emphasizes the importance of PLCs for the development of beginning teachers' individual learning. As previously mentioned, mentoring has been put forward in the literature as one of the most important initiatives to support beginning teachers (e.g. Hobson, Ashby, Malderez, & Tomlinson, 2009; Ingersoll & Strong, 2011). This dissertation reveals that PLCs, and more specifically the PLC characteristics, also play a

crucial role in stimulating beginning teachers' individual learning. Consequently, theorists have to consider the role of PLCs when developing a better understanding of beginning teachers' professional learning in DI.

Furthermore, this doctoral research project advances insight into the PLC concept. In this dissertation, we identified a PLC as a complex construct that can be measured by the Teacher's Professional Community index of Wahlstrom and Louis (2008). In line with recommendations by Lomos (2012) and Stoll and Louis (2007) this dissertation retested the Teacher's Professional Community index in a different educational context. More concrete, we validated this construct in Flemish primary schools. The results of our empirical study in chapter 2 confirmed the multidimensionality of the PLC concept with 'reflective dialogue', 'deprivatized practice', and 'collective responsibility' as the latent constructs. Hence, by operationalizing the concept and analyzing the abovementioned subdimensions with respect to other relevant variables concerning professional learning and turnover intentions this dissertation contributes to the validation of the PLC concept.

Moreover, this dissertation contributes to the research-based understanding of the way a PLC is developed. As explained in the general introduction, scholars stated that both structural and cultural school conditions needed to be present in a school in order to stimulate PLC development (e.g. Creemers, 2002) However, research that demonstrates which school conditions are relevant for building a PLC is scarce. Our dissertation confirms the theoretical reasoning that both structural and cultural school conditions are essential to facilitate PLC development. More specifically, we could identify scheduling planning time as an important structural school condition and trust as a valuable cultural school condition. Furthermore, there is a relationship between the extent to which school conditions are developed and the schools' stages of operating as PLCs. In other words, schools that succeed to create a mature PLC had also well-developed school conditions. Additionally, this dissertation illustrates that the school leader plays a pivotal role in creating supportive structural and cultural school conditions. More concrete, we

identified that the principal of the school that succeeded to build a mature PLC provided structured time for people to meet and collaborate, delegated leadership responsibilities, and maintained the high level of trust among the team members in the school.

Previous research indicated that the social cognitive theory (Bandura, 1977) and the JD-R model (Bakker & Demerouti, 2007) are useful conceptual frameworks for explaining employees' performance and the behavioral actions of people. Adding to this research, this dissertation offers a theoretical contribution by clarifying that the social cognitive theory provides a theoretical framework that can also be fruitfully applied for exploring beginning teachers' professional learning in DI. In addition, building on the JD-R model this dissertation contributes significantly in understanding the underlying psychological mechanisms of beginning teachers that lead to professionalization and to a decrease of their intention to leave the job. More specifically, teacher self-efficacy and affective commitment are identified as important psychological states that mediate the relationships between the PLC characteristics and teacher autonomy on the one hand and beginning teachers' professional learning in DI and their turnover intentions on the other. In this dissertation, the concepts that emerged from the school improvement literature (i.e. the PLC characteristics) were combined with the JD-R model and social cognitive theory originated in psychology. Hence, our dissertation integrated the current knowledge related to professional development and turnover intentions and present new knowledge on beginning teachers' professional learning and turnover intentions that emerged from a combination of educational and psychological backgrounds by capturing aspects of both the group and the individual.

Policy implications

In the 'policy note 2014-2019' the minister of Education, Hilde Crevits, underscores that education is teamwork whereby teachers need to collaborate with each other and with other members of the school team. We endorse the importance of collaboration and motivate policy makers to install legislation

that facilitate the development of PLCs within schools. Furthermore, as we found that PLCs foster teachers' professional learning we recommend policy makers to include collaborative initiatives such as reflective dialogue and deprivatized practice as a formal part of teachers' job description. Also, we stimulate policy makers to more explicitly include these collaborative initiatives in the basic competencies and professional profile so that preservice teachers learn in teacher education to value this type of collaboration.

The actual policy of the Flemish Educational Ministry also invests in pilot projects in primary schools in terms of differentiation so that schools can learn from each other. We acknowledge these initiatives for collaboration related to differentiation and encourage the Flemish Educational Ministry to further expand these initiatives. However, central policy has to protect teacher autonomy by giving the necessary autonomy to schools in order to create a school vision related to DI and to install a supportive school environment that guide their teachers to implement DI. We believe that when the legislator stipulates too many expectations and directives toward the school team in general and teachers in particular it impedes the development of an effective DI strategy. In addition, our research revealed that teacher education plays an ongoing role in beginning teachers' professional learning related to DI. In Flanders, teacher educators make efforts to develop training programs that provide preservice students a meaningful understanding of DI. By actualizing the basic competencies and the profession profile in accordance with the M-decree, the Flemish Educational Ministry can stimulate teacher education to include the use of DI as a key component of the teacher training program.

Furthermore, minister Crevits stated that too many and too early beginning teachers leave the teaching profession (Crevits, 2014). As was found in chapter 5, it is crucial to offer buffering school factors such as creating a sense of collective responsibility toward student learning among the members of the school team and to provide teacher autonomy to decrease beginning teachers' intention to leave the job. In addition, our findings rather surprisingly revealed that job insecurity does not affect beginning teachers' intention to leave the job.

In order to decrease beginning teachers' turnover intentions, policy makers do not need to focus primarily on offering beginning teachers stable contracts and reduced job insecurity but more importantly they need to invest in allowing schools to realize teacher autonomy and to support schools in their attempts to create a sense of collective responsibility.

We grant the attempts of policy makers to tackle the problems described above. However, we believe that the integration of the suggestions made in the previous paragraphs with the existing initiatives of the Flemish Educational Ministry could further stimulate collaboration among teachers, support teachers' learning processes, and reduce teacher attrition.

Practical implications

As beginning teachers' professional learning and retention is realized by a patchwork of different support structures, it is not self-evident to set one ideal recipe for practitioners. However, we believe the findings of our dissertation point toward supportive factors that stimulate beginning teachers to professionalize in DI and remain in education. We will discuss each of these aspects in depth below.

Autonomy and collaboration are two sides of the same coin. Our findings have illustrated that both teacher autonomy and collaboration are core elements in the learning processes of beginning teachers related to DI and their decision processes to quit teaching.

Schools can protect the autonomy of beginning teachers by giving them the opportunities to work autonomously and choose their own learning path. In relation to DI professionalization, schools can particularly allow beginning teachers to experience which differentiated teaching techniques and strategies they prefer to meet the needs of their students. Moreover, schools have to provide beginning teachers the possibilities to individually plan lessons with differentiated instructional methods.

Besides the provision of the necessary autonomy for beginning teachers, schools need to pay attention to stimulate collaboration in their entire school team. For both beginning teachers' DI learning and turnover intentions,

collective responsibility among the whole school team is identified as an important school factor. In this regard, schools should create a sense of collective responsibility among teachers so that the collaborative activities between teachers proceed effectively. This implies that schools need to generate conditions such as joint decision-making that strengthen a common sense of responsibility among teachers. Turning to the behavioral dimension of the PLC concept, we found that reflective dialogue and deprivatized practice matter for beginning teachers' professional learning in DI. Hence, it is crucial that, in order to stimulate beginning teachers' professionalization in DI, beginning teachers are encouraged to have in-depth conversations with colleague-teachers on how to realize DI in the classroom and to share knowledge and experiences related to DI. In addition, schools need to offer beginning teachers class-free hours to observe good differentiated teaching practices. These class-free hours might create chances to ask information and help during their personal process toward differentiated teaching.

Teacher education as the mirror and reflection of the work environment of successful schools. As autonomy and collaboration are essential for beginning teachers' professional learning and their intention to leave the job, teacher training programs need to be aware of the value of these supportive factors within schools. Consequently, teacher educators need to explain preservice teachers that collective responsibility and reflective dialogue are essential parts of the teaching job. As such, teacher educators can learn preservice students to collaborate with future colleagues in a constructive way and to develop the necessary skills to make joint decision-making possible. Furthermore, teacher training programs can expose preservice teachers to feedback-oriented practices. In Flanders, teacher training programs are partially centered around microteaching (i.e. preservice teachers teach for their classmates and teachers). During microteaching structural moments of meaningful feedback can be installed. Hence, this can lower the resistance of preservice teachers to be observed and can have positive effects to open classroom doors in the teaching practice. Also, we believe it is crucial that

teacher educators respect the autonomy of student teachers and allow them to experiment with teaching methods, strategies, and forms of pupil assessment during microteaching and their internship.

Teacher education is the stepping stone for continuous professional learning in DI. Our results have demonstrated that teacher education affects beginning teachers' professional learning in DI. In this regard, we recommend that teacher educators out of teacher training institutes collaborate with (experienced) teachers, and special needs coordinators who work in schools to discuss the authenticity of the DI examples introduced in the lessons of the teacher training programs. In addition, this collaboration between teacher training programs and schools can create opportunities for preservice teachers to enter the field earlier and learn, in an authentic school context, how to teach in a differentiated manner.

School leaders and special needs coordinators as support figures. Our findings revealed that the ability of the school leader to foster the development of PLCs indirectly influence their teachers to undertake professional learning activities related to DI. Hence, the development of principal expertise to support teachers, manage school improvement, and develop and install a DI school policy should be an important element of principal training. Furthermore, special needs coordinators are identified as important actors in PLC development and play a crucial role in the learning processes of beginning teachers in DI. In particular, special needs coordinators can observe the classroom practice of beginning teachers and give them feedback and advice how to implement DI in their lessons. As such, special needs coordinators can take on the role as confidant to whom beginning teachers can entrust concerns and ask openly how to deal with challenging needs of students. In addition, our findings showed that special needs coordinators can enhance the sense of collective responsibility among the school team by actively involving all teachers in creating and sustaining a DI vision. Special needs coordinator programs can provide training to build this kind of expertise in contributing to powerful PLCs.

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Nederlandstalige samenvatting

De rol van professionele leergemeenschappen voor de leeruitkomsten van beginnende leerkrachten en hun intentie om de job te verlaten

Theoretisch kader

In de literatuur wordt herhaaldelijk benadrukt dat het lerarenberoep een veeleisend beroep is (Darling-Hammond, Chung Wei, Alethea, Richardson, & Orphanos, 2009). Voornamelijk beginnende leerkrachten, die vanaf dag één geconfronteerd worden met een totaalpakket van verantwoordelijkheden en taken, ervaren moeilijkheden om tegemoet te komen aan de hoge eisen van het lerarenberoep (Tynjälä & Heikkinen, 2011). Dit proefschrift focust op twee grote uitdagingen voor het onderwijs. Ten eerste wordt het inspelen op de diverse noden van leerlingen beschouwd als een van de belangrijkste maar tegelijkertijd moeilijkste vaardigheden die beginnende leerkrachten moeten verwerven. In dit proefschrift gaan we dan ook na hoe de professionele ontwikkeling van beginnende leerkrachten met betrekking tot gedifferentieerde instructie gestimuleerd kan worden. Ten tweede blijft de uitstroom van beginnende leerkrachten een heikel punt in het onderwijs. Bijgevolg is het verminderen van de grote uitstroom van beginnende leerkrachten in het onderwijs een tweede uitdaging waarop we ons focussen in dit proefschrift. Steeds meer wordt in onderzoek beklemtoond dat de samenwerking tussen leerkrachten in scholen een belangrijke steun kan betekenen voor beginnende leerkrachten (Fantilli & McDougall, 2009; Johnson & Birkeland, 2003). In het bijzonder kunnen scholen door te functioneren als professionele leergemeenschappen (PLGs) de professionele ontwikkeling van beginnende

leerkrachten stimuleren en hen ook een gevoel van veiligheid en verbondenheid geven. Hoe scholen dit precies kunnen doen, is tot op heden echter onderbelicht in onderzoek. Er is in de eerste plaats een grote nood aan meer kwantitatief onderzoek. Daarom tracht dit proefschrift te meten op welke manier PLGs, en meer bepaald de PLG-kenmerken, de professionele ontwikkeling van beginnende leerkrachten in DI faciliteren en hun intentie verlagen om het lerarenberoep te verlaten.

Een school ontwikkelen tot een PLG gebeurt niet van vandaag op morgen. Er is reeds verkennend onderzoek uitgevoerd over welke school condities van belang zijn voor het ontwikkelen van een PLG (Stoll, Bolam, McMahon, Wallace, & Thomas, 2006). Toch is er een tekort aan diepgaande kwalitatieve studies die nagaan welke school condities cruciaal zijn voor het ontwikkelen van een PLG. Om een beter zicht te krijgen op de manier waarop PLGs een invloed hebben op de bovenvermelde uitkomsten van beginnende leerkrachten zullen we in dit proefschrift onderzoeken hoe school condities de PLG-ontwikkeling binnen scholen bevorderen. Hiermee komen we aan een tweede grote nood in het huidig onderzoek tegemoet.

Internationaal onderzoek beklemtoont de complexiteit van de processen die leiden tot het professioneel leren van leerkrachten en hun intentie om het lerarenberoep te verlaten (Opfer & Pedder, 2011; Price, 2004). Om een volledig beeld te krijgen van de factoren die van belang zijn voor de bovenvermelde uitkomsten werden naast de PLG-kenmerken andere schoolfactoren, contextgebonden factoren buiten de school en psychologische leerkrachtkenmerken betrokken in de analyse.

Onderzoeksdoelen en –methode

Het hoofddoel van dit proefschrift bestaat erin inzicht te krijgen in de relatie tussen PLGs en de uitkomsten van beginnende leerkrachten, namelijk de professionele ontwikkeling in DI en de intentie om het lerarenberoep te verlaten. Bovendien heeft dit proefschrift tot doel inzicht te krijgen in welke andere factoren de bovenvermelde uitkomsten van beginnende leerkrachten beïnvloeden. De onderzoeksdoelen die hierbij centraal staan zijn:

Onderzoeksdoel 1 (OD1): Het verband onderzoeken tussen PLG-kenmerken, andere relevante schoolfactoren (leerkrachtautonomie, schoolleiderschap, school DI-beleidsfactoren, en de diversiteit van de studentenpopulatie), de lerarenopleiding, doelmatigheidsbeleving en de professionele ontwikkeling van beginnende leerkrachten in DI.

Onderzoeksdoel 2 (OD2): Het verband onderzoeken tussen de PLG-kenmerken, leerkrachtautonomie, jobonzekerheid, doelmatigheidsbeleving, affectieve betrokkenheid en de intentie van beginnende leerkrachten om het lerarenberoep te verlaten.

Onderzoeksdoel 3 (OD3): Het in kaart brengen van de PLG-ontwikkeling binnen scholen en het verkennen van de factoren die PLG-ontwikkeling in scholen ondersteunen.

Om bovenstaande onderzoeksdoelen te bereiken hebben we geopteerd om zowel kwantitatieve als kwalitatieve deelstudies uit te voeren.

Het eerste onderzoeksdoel (OD1) wordt behandeld in hoofdstuk 2 en 3 van dit proefschrift. Om de professionalisering in DI van beginnende leerkrachten in kaart te brengen hebben we twee professionele leeractiviteiten gerelateerd aan DI geïdentificeerd, namelijk leren in interactie en verandering in praktijken. De kwantitatieve analyse van hoofdstuk 2 heeft als doel te exploreren in welke mate PLG-kenmerken, leerkrachtautonomie en het psychologisch leerkrachtkenmerk doelmatigheidsbeleving van belang zijn voor de leeractiviteit verandering in praktijken. Hiervoor werden 227 beginnende leerkrachten uit 65 basisscholen bevraagd aan de hand van een zelfrapportage vragenlijst. Zowel exploratieve en confirmatorische factoranalyses als pad analyses werden uitgevoerd om de data te analyseren. Voor de studie beschreven in hoofdstuk 3 werden gegevens verzameld van 272 beginnende leerkrachten uit 72 basisscholen aan de hand van een zelfrapportage vragenlijst. Daarnaast werden beleidsdocumenten van scholen waarin de visie ten aanzien van DI stond beschreven, opgevraagd. De data van deze beleidsdocumenten werden gekwantificeerd en daarna samen verwerkt met de data uit de leerkrachtbevraging. Deze studie heeft als doel het identificeren van de school-

en contextgebonden factoren die van belang zijn voor de professionele leeractiviteiten leren in interactie en verandering in praktijken. Er werd gebruik gemaakt van multi-level analyse technieken om de data te analyseren.

Het tweede onderzoeksdoel (OD2) wordt behandeld in hoofdstuk 5. Om inzicht te verwerven in welke mate school- en contextgebonden factoren en psychologische leerkrachtkenmerken de intentie van beginnende leerkrachten verlagen om het lerarenberoep te verlaten, werd een zelfrapportage vragenlijst afgenomen bij 272 beginnende leerkrachten uit 72 basisscholen. Hiervoor werden naast factoranalyses ook pad analyses gebruikt.

Om aan het laatste onderzoeksdoel (OD3) tegemoet te komen, werd een kwalitatieve studie (hoofdstuk 4) uitgevoerd in drie basisscholen. Deze scholen werden geselecteerd op basis van de resultaten gevonden in hoofdstuk 2. Er werden semigestructureerde interviews afgenomen van de directeur, de zorgcoördinator en 2 à 3 beginnende leerkrachten per school. Het hoofddoel van deze studie is het in kaart brengen van de PLG-ontwikkeling in de drie scholen. Daarnaast willen we de school condities blootleggen die de PLG-ontwikkeling bevorderen in de scholen. De resultaten werden in kaart gebracht op basis van verticale en horizontale analyses van de scholen.

Overzicht van de resultaten

Professionele ontwikkeling in gedifferentieerde instructie (OD1)

Tot op heden heeft onderzoek naar PLGs zich voornamelijk gefocust op het leerproces en de prestaties van leerlingen. Er is weinig aandacht besteed aan de professionele ontwikkeling van leerkrachten in het algemeen en aan de professionele ontwikkeling van beginnende leerkrachten in het bijzonder. Zoals eerder vermeld benadrukken onderzoekers de complexiteit van de professionele ontwikkeling van leerkrachten. Daarom werd er in dit proefschrift geopteerd om naast de PLG-kenmerken leerkrachtautonomie, schoolleiderschap, school DI-beleidsfactoren, en de diversiteit van de studentenpopulatie in overweging te nemen als mogelijke schoolfactoren die bijdragen tot de professionele ontwikkeling in DI. Bovendien kunnen andere factoren buiten de school eveneens de professionele ontwikkeling van

beginnende leerkrachten in DI ondersteunen. In dit proefschrift werd de lerarenopleiding beschouwd als een contextgebonden factor die de professionele ontwikkeling van beginnende leerkrachten in DI kan stimuleren. Ook de doelmatigheidsbeleving van leerkrachten werd als mogelijke invloedrijke psychologische factor in de analyse betrokken. In lijn met de sociaal-cognitieve leertheorie (Bandura, 1997) en het Job-Demands Resources (JD-R) model (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007) hebben we daarenboven vooropgesteld dat de doelmatigheidsbeleving van leerkrachten de relatie tussen de schoolfactoren, dit zijn leerkrachtautonomie en de PLG-kenmerken, en het professioneel leren van beginnende leerkrachten in DI zou mediëren. Twee kwantitatieve studies gingen na welke factoren van belang zijn voor de professionele ontwikkeling van beginnende leerkrachten in DI, namelijk leren in interactie en verandering in praktijken.

Leren in interactie

Uit de resultaten van het onderzoek blijkt dat de lerarenopleiding direct negatief gerelateerd is aan leren in interactie. Dit betekent dat beginnende leerkrachten die rapporteren dat de lerarenopleiding hun mind-set ten aanzien van DI veranderd heeft, minder frequent feedback of informatie vragen aan hun collega's met betrekking tot het toepassen van DI in hun klaspraktijk. Daarenboven hebben de PLG-kenmerken praktijkdeprivatisering en reflectieve dialoog een rechtstreekse invloed op de professionele leeractiviteit leren in interactie. Anders gezegd: hoe meer beginnende leerkrachten de kans krijgen om met collega's te discussiëren over onderwijskundige kwesties en hoe vaker ze de mogelijkheden krijgen om de onderwijspraktijken van andere leerkrachten te observeren, hoe meer ze geneigd zullen zijn om feedback en informatie aan collega's te vragen over het toepassen van DI in hun klaspraktijk. Ten slotte speelt de school DI-beleidsfactor onderwijstype een rol voor de participatie van beginnende leerkrachten in de professionele leeractiviteit leren in interactie. Beginnende leerkrachten uit methodescholen geven aan meer feedback en informatie te vragen bij hun collega's over het toepassen van DI dan beginnende leerkrachten uit traditionele scholen.

Verandering in praktijken

De resultaten van de studies tonen aan dat reflectieve dialoog en leerkrachtautonomie een rechtstreekse relatie hebben met de professionele leeractiviteit verandering in praktijken. Ook is de lerarenopleiding positief gerelateerd aan verandering in praktijken. Beginnende leerkrachten die vinden dat hun opleiding veranderingen hebben teweeg gebracht in hun mind-set ten aanzien van DI rapporteren ook meer veranderingen in hun klaspraktijk gerelateerd aan DI. Daarenboven blijkt dat de doelmatigheidsbeleving van leerkrachten samenhangt met de professionele leeractiviteit verandering in praktijken. Anders gezegd, beginnende leerkrachten die een hogere doelmatigheidsbeleving hebben, zullen sneller geneigd zijn om hun klaspraktijken aan te passen aan de diverse noden van hun leerlingen. Onze resultaten bevestigen daarenboven het mediërend effect van doelmatigheidsbeleving. In het bijzonder tonen de resultaten aan dat doelmatigheidsbeleving een partieel mediërende invloed heeft in de relatie tussen leerkrachtautonomie en verandering in praktijken. Dit betekent dat leerkrachtautonomie niet alleen rechtstreeks van belang is voor verandering in praktijken maar ook inspeelt op doelmatigheidsbeleving. Anders gezegd, hoe meer autonomie beginnende leerkrachten ervaren, hoe meer zelfvertrouwen beginnende leerkrachten krijgen. Een verhoogd gevoel van zelfvertrouwen zorgt er op zijn beurt voor dat beginnende leerkrachten meer bereid zijn om veranderingen in hun klaspraktijk door te voeren. Bovendien wijzen onze resultaten uit dat doelmatigheidsbeleving de relatie tussen gezamenlijke verantwoordelijkheid en verandering in praktijken volledig medieert. Dit betekent dat door de gezamenlijke verantwoordelijkheid voor het leren van de leerlingen, beginnende leerkrachten meer zelfvertrouwen krijgen. Door hun groter zelfvertrouwen zijn beginnende leerkrachten meer bereid om veranderingen in hun klaspraktijk door te voeren. Verder stellen we vast dat het onderwijstype en het aantal kansarme leerlingen die aanwezig zijn in de school rechtstreeks van belang zijn voor de professionele leeractiviteit verandering in praktijken. Deze bevinding impliceert dat beginnende leerkrachten uit

methodescholen en beginnende leerkrachten uit scholen met veel kansarme leerlingen meer verandering in praktijken ten aanzien van DI percipiëren dan hun beginnende collega's uit traditionele scholen en scholen met weinig kansarme leerlingen.

De intentie om het lerarenberoep te verlaten (OD2)

Studies in het kader van de sociaal-cognitieve leertheorie en het Job-Demands Resources (JD-R) model geven aan dat doelmatigheidsbeleving en affectieve betrokkenheid een mediërende rol spelen in het verklaren van de intentie van werknemers om het beroep te verlaten (Avey, Luthans, & Jensen, 2009; Bakker, Demerouti, & Schaufeli, 2003; Bandura, 1997). In het onderwijsonderzoek is deze thematiek van het JD-R model echter weinig onderzocht. In de volgende kwantitatieve studie gingen wij dan ook op zoek naar belangrijke kenmerken, gesitueerd in het JD-R model, die de intentie van beginnende leerkrachten reduceren om het lerarenberoep te verlaten.

In een hypothetisch model is onderzocht in hoeverre schoolfactoren, dit zijn de PLG-kenmerken en leerkrachtautonomie, en de contextgebonden factor jobonzekerheid, een directe invloed hebben op de intentie van beginnende leerkrachten om het lerarenberoep te verlaten. Daarenboven gingen we met deze studie na of de psychologische kenmerken van beginnende leerkrachten, namelijk doelmatigheidsbeleving en affectieve betrokkenheid, de relatie tussen de schoolfactoren en de intentie om het lerarenberoep te verlaten mediëren. Ook werd onderzocht of affectieve betrokkenheid een mediërende rol speelt in de relatie tussen jobonzekerheid en de intentie van beginnende leerkrachten om het beroep te verlaten. De resultaten wijzen erop dat de invloed van leerkrachtautonomie en gezamenlijke verantwoordelijkheid op de intentie om het lerarenberoep te verlaten volledig indirect verloopt, met doelmatigheidsbeleving en affectieve betrokkenheid als mediërende variabelen. Dit benadrukt de psychologische aard van de processen die ervoor zorgen dat beginnende leraren het beroep verlaten. In het bijzonder wordt de relatie tussen leerkrachtautonomie en het PLG-kenmerk gezamenlijke verantwoordelijkheid enerzijds en de intentie om het lerarenberoep te verlaten anderzijds volledig

gemedieerd door doelmatigheidsbeleving. Anders gezegd, beginnende leerkrachten die het gevoel hebben meer autonoom te kunnen handelen en een sterker gevoel van gezamenlijke verantwoordelijkheid ervaren, geven aan meer te geloven dat zij doelmatig zijn als leerkracht. Op zijn beurt tonen de resultaten aan dat een hoge mate van doelmatigheidsbeleving de intentie van beginnende leerkrachten verlaagt om het lerarenberoep te verlaten. Daarenboven wordt de relatie tussen leerkrachtautonomie en gezamenlijke verantwoordelijkheid enerzijds en de intentie om het lerarenberoep te verlaten anderzijds volledig gemedieerd door de affectieve betrokkenheid van beginnende leerkrachten. De resultaten tonen bijgevolg aan dat gezamenlijke verantwoordelijkheid het enige PLG-kenmerk is dat een belangrijke rol speelt voor de intentie van beginnende leerkrachten om het lerarenberoep te verlaten. De PLG-kenmerken praktijkdeprivatisering en reflectieve dialoog en de contextgebonden factor jobonzekerheid dragen niet bij tot het verlagen van de intentie van beginnende leerkrachten om het lerarenberoep te verlaten.

De ontwikkeling van professionele leergemeenschappen (OD3)

De resultaten bij de eerste onderzoeksvraag wezen reeds op het belang van de PLG-kenmerken voor de professionele ontwikkeling van beginnende leerkrachten in DI. Om deze resultaten verder uit te diepen en meer inzicht te verwerven in de PLG-ontwikkeling binnen scholen werd in een volgende studie onderzoek gedaan bij één school met een lage score inzake verandering in DI-praktijken, één school met een gemiddelde score en één school met een hoge score.

Interviews met schoolleiders, beginnende leerkrachten en zorgcoördinatoren tonen aan dat de scholen met een lage, gemiddelde en hoge score inzake verandering in praktijken bij beginnende leerkrachten sterk overeen komen met de mate van PLG-ontwikkeling. De school met de lage score bevindt zich in de beginnende fase van PLG-ontwikkeling. De school met de gemiddelde score en de school met de hoge score kunnen respectievelijk gesitueerd worden in de fase van ontwikkeling en de fase van institutionalisering. De fasen van PLG-ontwikkeling waarin de scholen

onderverdeeld kunnen worden beïnvloeden op een verschillende manier de professionele ontwikkeling van beginnende leerkrachten in DI. In het bijzonder is er weinig steun van het schoolteam in de school die zich bevindt in de beginnende fase van PLG-ontwikkeling om beginnende leerkrachten te helpen in hun professionalisering in DI. In de school die gesitueerd kan worden in de fase van ontwikkeling geven beginnende leerkrachten aan dat het schoolteam hen in zekere mate ondersteunt om zich te professionaliseren in DI. Ten slotte verwijzen beginnende leerkrachten die lesgeven in de school die zich bevindt in de fase van institutionalisering naar verscheidene ondersteunende acties vanuit het schoolteam die hun professionele ontwikkeling in DI hebben bevorderd.

Bij de analyse van het ontwikkelingsproces van de PLG in de drie scholen kunnen een aantal belangrijke verschillen worden vastgesteld. In de school in de institutionaliseringsfase zijn er meer structurele school condities om de PLG-ontwikkeling en de DI-implementatie te ondersteunen dan in de andere twee scholen. Niet alleen worden in deze school meer formeel georganiseerde overlegmomenten voor de leden van het schoolteam voorzien om samen te werken. Ook worden meer organisatorische beslissingen genomen om het hanteren van DI te vergemakkelijken, zoals het installeren van een differentiatietafel per klas en het verkleinen van de klasgrootte. Onze resultaten tonen aan dat deze organisatorische structuren meer kansen bieden aan beginnende leerkrachten om onderwijskwesties met collega's te bespreken en de klaspraktijk van collega-leerkrachten te observeren.

De drie scholen verschillen ook inzake culturele school condities. Met name blijkt dat het vertrouwen in het team enerzijds en het creëren en in stand houden van een visie op DI anderzijds sterk verschilt. De respondenten van de school in de institutionaliseringsfase geven aan dat er een sterk gevoel van vertrouwen heerst tussen de collega's onderling. Daarentegen heerst er minder vertrouwen in de school in de ontwikkelingsfase en is er zelfs een gebrek aan vertrouwen in de school in de beginnende fase van PLG-ontwikkeling. Eenzelfde patroon is terug te vinden inzake de visie op DI. In de school in de institutionaliseringsfase spelen zowel de directeur, de zorgcoördinator als

ervaren leerkrachten een belangrijke rol bij de ontwikkeling van een duidelijke DI-visie. Bovendien zijn alle leerkrachten actief betrokken bij de verdere ontwikkeling van de DI-visie en dit wordt tijdens de formele vergaderingen regelmatig besproken. Dit leidt in deze school tot een sterker gevoel van gezamenlijke verantwoordelijkheid ten aanzien van het leren van alle leerlingen. In de school in de ontwikkelingsfase wordt de schoolleider samen met het kernteam geïdentificeerd als centrale figuren die de DI-visie binnen de school ontwikkelen en opleggen aan het hele team. Ten slotte wordt in de school in de beginnende fase van PLG-ontwikkeling enkel de schoolleider aangegeven als een actieve voorstander van het creëren van een DI-visie wat het gevoel van gezamenlijke verantwoordelijkheid voor het leren van alle leerlingen belemmert.

De schoolleiders nemen eveneens verschillende posities in om de bovenstaande structurele en culturele school condities uit te bouwen. De schoolleider van de school in de fase van institutionalisering speelt een prominente rol bij het voorzien van organisatorische structuren om PLG-ontwikkeling en DI-implementatie mogelijk te maken. Daarenboven betrekt de schoolleider de zorgcoördinator en de ervaren leerkrachten in de creatie van de DI-visie van de school. De schoolleider van de school in de ontwikkelingsfase besteedt voornamelijk aandacht aan de structurele school condities, terwijl de schoolleider van de school in de beginnende fase van PLG-ontwikkeling weinig inzet op het aanbieden van zowel structurele als culturele school condities.

Algemene conclusie

Voorliggend onderzoek wenst op basis van kwantitatieve studies en een kwalitatieve studie een duidelijker beeld te krijgen van de relatie tussen PLGs en de uitkomsten van beginnende leerkrachten, namelijk de professionele ontwikkeling in DI en de intentie om het lerarenberoep te verlaten. Daarnaast wensen we het effect van andere schoolfactoren naast de PLGs, contextgebonden factoren en psychologische leerkrachtkenmerken op de bovenvermelde uitkomsten na te gaan.

Ons onderzoek illustreert dat PLGs van cruciaal belang zijn voor zowel het professioneel leren van beginnende leerkrachten in DI als hun intentie om het lerarenberoep te verlaten. In het bijzonder illustreren onze bevindingen dat de PLG-kenmerken reflectieve dialoog en praktijkdeprivatisering rechtstreeks bijdragen tot de professionele ontwikkeling van beginnende leerkrachten in DI terwijl het PLG-kenmerk gezamenlijke verantwoordelijkheid inspeelt op de psychologische processen van de leerkrachten. Meer bepaald zorgt een grotere gezamenlijke verantwoordelijkheid in het schoolteam ervoor dat beginnende leerkrachten een groter gevoel van zelfvertrouwen en een grotere betrokkenheid ten aanzien van de school ervaren. Op hun beurt zorgt een groter gevoel van zelfvertrouwen en een grotere betrokkenheid ten aanzien van de school ervoor dat beginnende leerkrachten minder geneigd zijn om het lerarenberoep te verlaten en zich ook meer ondersteund voelen in hun professionele ontwikkeling in DI. Onze kwalitatieve studie brengt eveneens aan het licht hoe belangrijk de schoolleider is voor het ontwikkelen van een PLG en de PLG-kenmerken binnen een school. Niet alleen blijkt de schoolleider een spilfiguur te zijn voor het voorzien van organisatorische structuren, ook heeft de schoolleider een centrale rol in het faciliteren van de culturele school condities om PLG-ontwikkeling en DI-implementatie mogelijk te maken.

Eerder onderzoek heeft aangetoond dat, naast samenwerking tussen leerkrachten, autonomie een belangrijke functie heeft in de professionele ontwikkeling van leerkrachten en hun intentie om het lerarenberoep te verlaten (o.a. Clement en Vandenberghe, 2000; Ingersoll and May, 2010). Onze bevindingen stellen vast dat autonomie niet alleen rechtstreeks van belang is voor het professioneel leren in DI, maar ook bijdraagt tot de psychologische processen die inspelen op het professioneel leren van beginnende leerkrachten en hun intentie om het onderwijs te verlaten. Ons onderzoek bevestigt dus de vaststelling dat zowel autonomie als samenwerking essentieel zijn voor het professioneel leren van leerkrachten en hun intentie om het lerarenberoep te verlaten.

Op basis van de bevindingen in dit onderzoek kunnen we eveneens vaststellen dat de lerarenopleiding een belangrijke factor is om de professionele ontwikkeling van beginnende leerkrachten in DI te stimuleren. Naast de traditionele opvatting dat mentoring belangrijk is (o.a. Carter & Francis, 2001; Ingersoll & Smith, 2004) blijkt uit de resultaten van dit onderzoek dat zowel de PLG-kenmerken als de lerarenopleiding overwogen moeten worden als twee bijkomende factoren die een belangrijke rol spelen in de aanvangsbegeleiding van beginnende leerkrachten.

Bij deze bevindingen moet rekening gehouden worden met een aantal beperkingen van ons onderzoek. De gerapporteerde studies vonden enkel plaats in Vlaamse basisscholen. Het zou daarom interessant zijn om dit onderzoek uit te voeren in andere settings: secundaire scholen en landen met een andere beleidscontext. Ook een uitbreiding van de beperkte steekproeven voor zowel de kwantitatieve studies als de kwalitatieve analyse zou een meerwaarde betekenen. In verder onderzoek raden we ook aan om andere variabelen te onderzoeken, zowel op school-, leerkracht- als leerlingniveau. Een volgende suggestie is het gebruik van andere onderzoeksmethoden zoals observaties en logboeken en het uitvoeren van longitudinaal onderzoek om eventuele causale verbanden te kunnen vaststellen.

Uitgaande van de resultaten beschreven in dit proefschrift kunnen een aantal implicaties vermeld worden. De belangrijkste theoretische implicatie van dit proefschrift is dat PLGs, en meer in het bijzonder de PLG-kenmerken, een krachtige factor zijn om het individueel leren van beginnende leerkrachten te versterken. Om een beter begrip te krijgen van het professioneel leren in DI van beginnende leerkrachten is het bijgevolg belangrijk dat onderzoekers bewust zijn van de ondersteuning die PLGs kunnen bieden aan beginnende leerkrachten. Onze bevindingen hebben aangetoond dat zowel leerkrachtautonomie als samenwerking, en PLGs in het bijzonder, kernelementen zijn in de leerprocessen van beginnende leerkrachten gerelateerd aan DI en de besluitvormingsprocessen die ertoe leiden dat beginnende leerkrachten het lerarenberoep verlaten. Daarnaast heeft dit

proefschrift bijgedragen tot het inzicht in de ontwikkeling van PLGs. Dit proefschrift heeft empirisch aangetoond dat zowel structurele als culturele schoolcondities hierin essentieel zijn.

Op beleidsniveau raden we aan om ondersteunende maatregelen uit te werken die de ontwikkeling van PLGs binnen scholen vergemakkelijken en basiscompetenties op te nemen in het beroepsprofiel van de leraar die het belang van samenwerking met collega's onderstrepen. Onze resultaten suggereren eveneens dat er op beleidsniveau blijvende aandacht moet zijn om de autonomie van de leerkracht in de school te verzekeren. We hebben daarenboven vastgesteld dat de lerarenopleiding een cruciale rol speelt in de professionele ontwikkeling van beginnende leerkrachten in DI. Hieruit vloeit voort dat het belangrijk is dat de Vlaamse overheid de lerarenopleiding stimuleert om het toepassen van DI in de klaspraktijk op te nemen als een belangrijk onderdeel van de lerarenopleiding. Tot slot heeft het voorliggend proefschrift praktische implicaties. Het is essentieel dat scholen de autonomie van hun beginnende leerkrachten beschermen maar tegelijkertijd beginnende leerkrachten aansporen om samen te werken met hun collega's. Schoolleiders moeten zich hierbij bewust zijn dat zij een bijzondere rol spelen om organisatorische structuren te voorzien en een sfeer van vertrouwen te creëren binnen het team die samenwerking mogelijk maakt. Ten slotte is het aangewezen dat samenwerkingsverbanden tussen de lerarenopleiding en scholen aangemoedigd worden zodat de overgang van de opleiding naar de onderwijspraktijk vlotter verloopt.

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Academic output

Journals (A1)

De Neve, D., Devos, G., & Tuytens, M. (2015). The importance of job resources and self-efficacy for beginning teachers' professional learning in differentiated instruction. *Teaching and Teacher Education, 47*, 30-41. doi:10.1016/j.tate.2014.12.003

De Neve, D., & Devos, G. (2016). The role of environmental factors in beginning teachers' professional learning related to differentiated instruction. *School Effectiveness and School Improvement*, Advance online publication. doi:10.1080/09243453.2015.1122637

De Neve, D., & Devos, G. (accepted). How do professional learning communities aid and hamper professional learning of beginning teachers related to differentiated instruction? *Teachers and Teaching: Theory and Practice*.

De Neve, D., & Devos, G. (submitted). How green is the grass on the other side? Exploring the intention of beginning teachers to leave the teaching profession. *European Journal of Teacher Education*.

Conference contributions

De Neve, D., & Vanblaere, B., & Devos, G. (2014). *Exploring the link between professional learning communities and beginning teachers' professional development in differentiated instruction.* Paper presented at the International Congress for School Effectiveness and Improvement, Yogyakarta, Indonesia, January 2-7 2015.

De Neve, D., & Devos, G. (2015). *Which factors matter for the participation of beginning teachers in professional learning activities related to differentiated instruction?* Paper presented at the International Congress

for School Effectiveness and Improvement, Cincinnati, Ohio, USA, January 3-6 2015.

De Neve, D., Devos, G., & Tuytens, M. (2015). *The interplay between teacher and school characteristics to stimulate beginning teachers' professional development in differentiated instruction*. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, Illinois, USA, April 16-20 2015.

De Neve, D., & Devos, G. (2015). *Teacher education and the school context matter for beginning teachers' professional learning in differentiated instruction*. Paper presented at the Association for Teacher Education in Europe 40th Annual Conference, Glasgow, UK, August 24-26 2015.

Vanblaere, B., De Neve, D., & Devos, G. (2014). *Individual characteristics and professional learning community-perception of formally designated teacher leaders.* Paper presented at the International Congress for School Effectiveness and Improvement, Yogyakarta, Indonesia, January 2-7 2015.

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3. Information about the files that have been stored

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3a. Raw data

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* Have the raw data been stored by the main researcher? [X] YES / [ ] NO
If NO, please justify:

* On which platform are the raw data stored?
- [X] researcher PC
- [ ] research group file server
- [X] other (specify): external hard disk stored in the researcher's office

* Who has direct access to the raw data (i.e., without intervention of another person)?
- [X] main researcher
- [ ] responsible ZAP
- [ ] all members of the research group
- [ ] all members of UGent
- [ ] other (specify): ...

3b. Other files

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* Which other files have been stored?

- [X] file(s) describing the transition from raw data to reported results. Specify: A coding scheme was stored that has been used to analyze the interview data.
- [X] file(s) containing processed data. Specify: All interviews were transcribed and saved as Word files. All relevant text fragments of the transcribed interviews were stored in an Nvivo file (making use of a coding tree).
- [X] file(s) containing analyses. Specify: For each participant thematic summaries were created in order to structure the extensive text and reduce the data. These summaries contain the results of the within-case analysis (step 1). In the cross-case analysis (step 2), all interviewees in one school (case) were compared and contrasted and common or different patterns were identified. Third, communalities and differences were sought through a second cross-case analysis that compared and contrasted the three cases (step 3). Reports of these within-case and cross-case analyses were saved as Nvivo and Word files.
- [ ] files(s) containing information about informed consent
- [ ] a file specifying legal and ethical provisions
- [ ] file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...
- [ ] other files. Specify: ...

* On which platform are these other files stored?

- [X] individual PC
- [ ] research group file server
- [ ] other: ...

* Who has direct access to these other files (i.e., without intervention of another person)?

- [X] main researcher
- [ ] responsible ZAP

- [ ] all members of the research group
- [ ] all members of UGent
- [ ] other (specify): ...

4. Reproduction

==========

* Have the results been reproduced independently?: [ ] YES / [X] NO

* If yes, by whom (add if multiple):
  - name:
  - address:
  - affiliation:
  - e-mail:

% Data Storage Fact Sheet

% Name/identifier study: Chapter 5
% Author: Debbie De Neve
% Date: January, 15, 2016

1. Contact details
==========

1a. Main researcher

- name: Debbie De Neve
- address: Henri Dunantlaan 2 - 9000 Ghent - Belgium
- e-mail: Debbie.DeNeve@UGent.be

1b. Responsible Staff Member (ZAP)

- name: Geert Devos (promotor PhD project)
- address: Henri Dunantlaan 2 - 9000 Ghent - Belgium
- e-mail: Geert.Devos@UGent.be

If a response is not received when using the above contact details, please send an email to data.pp@ugent.be or contact Data Management, Faculty of Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent, Belgium.

2. Information about the datasets to which this sheet applies

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* Reference of the publication in which the datasets are reported:
De Neve, D., & Devos, G. (submitted). How green is the grass on the other side? Exploring the intention of beginning teachers to leave the teaching profession. European Journal of Teacher Education.

* Which datasets in that publication does this sheet apply to?:
This sheet applies to the complete dataset of the study reported in Chapter 5 of the dissertation.

3. Information about the files that have been stored

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3a. Raw data

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* Have the raw data been stored by the main researcher? [X] YES / [ ] NO
If NO, please justify:

* On which platform are the raw data stored?
- [X] researcher PC
- [ ] research group file server
- [X] other (specify): external hard disk stored in the researcher's office

* Who has direct access to the raw data (i.e., without intervention of another person)?
- [X] main researcher
- [ ] responsible ZAP
- [ ] all members of the research group
- [ ] all members of UGent
- [ ] other (specify): ...

3b. Other files

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* Which other files have been stored?

- [X] file(s) describing the transition from raw data to reported results. Specify: SPSS syntax files and R syntax files were stored.
- [X] file(s) containing processed data. Specify: teacher survey data was processed (i.e. cleaned data in SPSS, transformed into .csv-file format for analysis in R – lavaan and lavaan.survey)
- [X] file(s) containing analyses. Specify: R output (i.e. output of preliminary analyses as well as output of the main analyses regarding the research questions) was stored as Word files.
- [ ] files(s) containing information about informed consent
- [ ] a file specifying legal and ethical provisions
- [ ] file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...
- [ ] other files. Specify: ...

* On which platform are these other files stored?

- [X] individual PC
- [ ] research group file server
- [ ] other: ...

* Who has direct access to these other files (i.e., without intervention of another person)?

- [X] main researcher
- [ ] responsible ZAP
- [ ] all members of the research group
- [ ] all members of UGent
- [ ] other (specify): ...

4. Reproduction

==========

* Have the results been reproduced independently?: [ ] YES / [X] NO

* If yes, by whom (add if multiple):
  - name:
  - address:
  - affiliation:
  - e-mail: